The IRON AGE

April 21, 1960 A Chilton Publication The National Metalworking Weekly

Welding Show Feature:

How to Choose Arcwelding Electrodes P. 145

Will Competition Weaken Prices? – P. 105

Steel's Biggest Users in 1959 – P. 112

Digest of the Week – P. 2-3

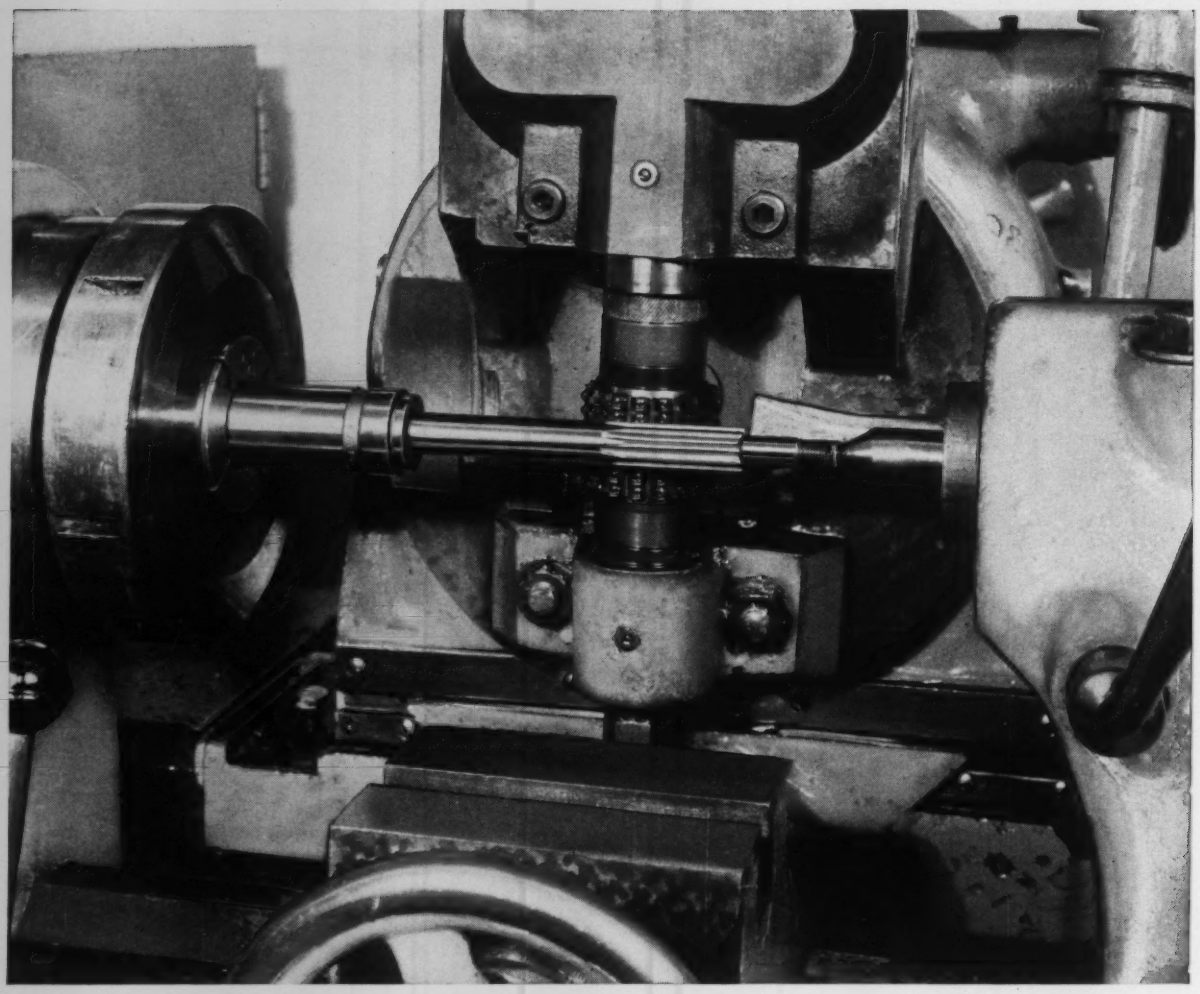
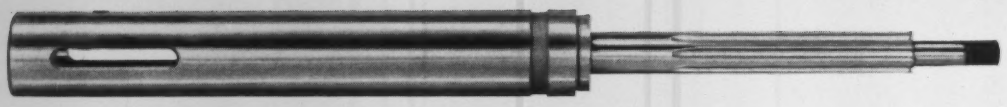


Photo courtesy Greenlee Bros. & Co.



Aristoloy Leaded Doubles Tool Life... Increases Feed 70% for Greenlee

ARISTOLOY STEELS

Two divisions of Greenlee Bros. & Co. switched to Aristoloy 4150 leaded. Faster machining—feeds and speeds boosted 60 to 70%—and improved surface finish were realized by the Machine Division on gears, spindles and shafts. Similar benefits were realized by the machine tool maker's Tool Division on machine bits, hydraulic rams, pistons and cylinders. Tool life was upped 200%, drastically reducing tool costs and eliminating hours of down-time for changes.

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The IRON AGE

April 21, 1960—Vol. 185, No. 16

Digest of the Week in

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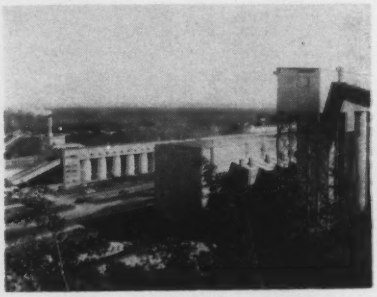
News of the Industry

METALWORKING PRICES

Weaknesses Crop Up—Scattered price cuts on the fringes show up in many products. Reason: Domestic competition, foreign competition, tougher purchasing tactics. P. 105

NICKEL MILL

Automation in the Wilds — A highly automated ore milling plant



has been opened in the rugged Sudbury District of Ontario. P. 107

TACONITE EXPANDS

Insurance Policy — Steel companies increase their interest in beneficiating low-grade domestic ores. It's part of a policy of expanding sources of ore as insurance against political unrest in some ore-rich countries. P. 108

BUYING TECHNIQUES

Low Inventories — New buying and inventory control techniques

Metalworking

Cover Feature

ELECTRODES — Efficient welds depend upon proper electrode choice. But too many companies need more education on this score. In contrast, the fabricating shop at Bethlehem Steel's Pottstown Works gets the most from each electrode. P. 145

keep stocks low, Malleable Foundrymen are told. P. 109

NEW PIPELINES

FPC Gives Approval—Producers of linepipe are rushing equipment back into operation to meet the demand from new pipeline projects. Some mills had been down as long as six weeks. P. 111

Engineering-Production Developments

STACKING FRAMES

Speed Castings—Simple stacking frames speed gray iron castings through two transfer machines. The first machine feeds castings to single-stage work stations. Final machining takes place in the second transfer unit. The latter machine handles castings in pairs. One man tends both transfer units. P. 150

NONDESTRUCTIVE TESTS

On Aluminum Alloys — Good testing methods are essential for the aluminum alloy forgings that go into aircraft. An aluminum manufacturer is aiming for top quality forgings through ultrasonics. This method provides a nondestructive means of gaging internal quality of various parts. P. 152

PLASTIC MOLDING

Using Preforms—Preforming not only simplifies molding, but also makes it easier to control quality. On top of that, the process can achieve high production at low cost. For certain molded parts, preforming will reduce bulk factor by quite an extent. P. 154

GAGING HEAT

Aids Steelmaking—A new automatic system records furnace-flame intensity to show progress of steelmaking reaction. The record indicates to the melter and furnace operator the start of silicon blow, carbon blow, and when the heat is ready to be tapped. P. 156

DRUM MACHINING

For Precision Parts—A precision turning device machines accurate electronic computer memory drums to tolerances of 0.000050 in. The specially-built machine replaces a lathe-and-saddle fixture formerly used to turn the final diameter of memory drums. P. 158

Market and Price Trends

BUILDERS LED STEEL USE

Top Consumers in '59 — Steel shipments to users last year were 69.3 million tons, almost 10 million above 1958 totals. Builders were leading consumers in IRON AGE analysis of shipments. P. 112

ENAMELED TANKS

Promising New Market—Industrial sales of enamel-on-steel containers are a promising market for enamelers. Steel enameling sales, over $400 million in 1959, could reach $500 million in 1960. P. 113

AUTOMOTIVE

Look Ahead to '61—The auto industry's 1961 models will tend to be shorter, slimmer, and lighter. More medium-compacts are on the way. And four-passenger small cars are a possibility. P. 121

STEEL SUMMARY

Cancellations Hit Bottom—The volume of incoming orders is close to the bottom, and cancellations have hit bottom. This would indicate that an order improvement seems certain in the near future. P. 203

NEXT WEEK

SECOND HALF PLANS

Trend Indicators — Purchasing executives have a pretty good idea of what and how much they will be buying in the second half. In next week's special report, second half buying plans will be analyzed in terms of business trends.

FOUNDRY AUTOMATION

Doubles Production — Does a booming company have to build a new manufacturing plant to keep pace with spiralling sales? Next week's issue will show how one company increased its output without adding floor space.

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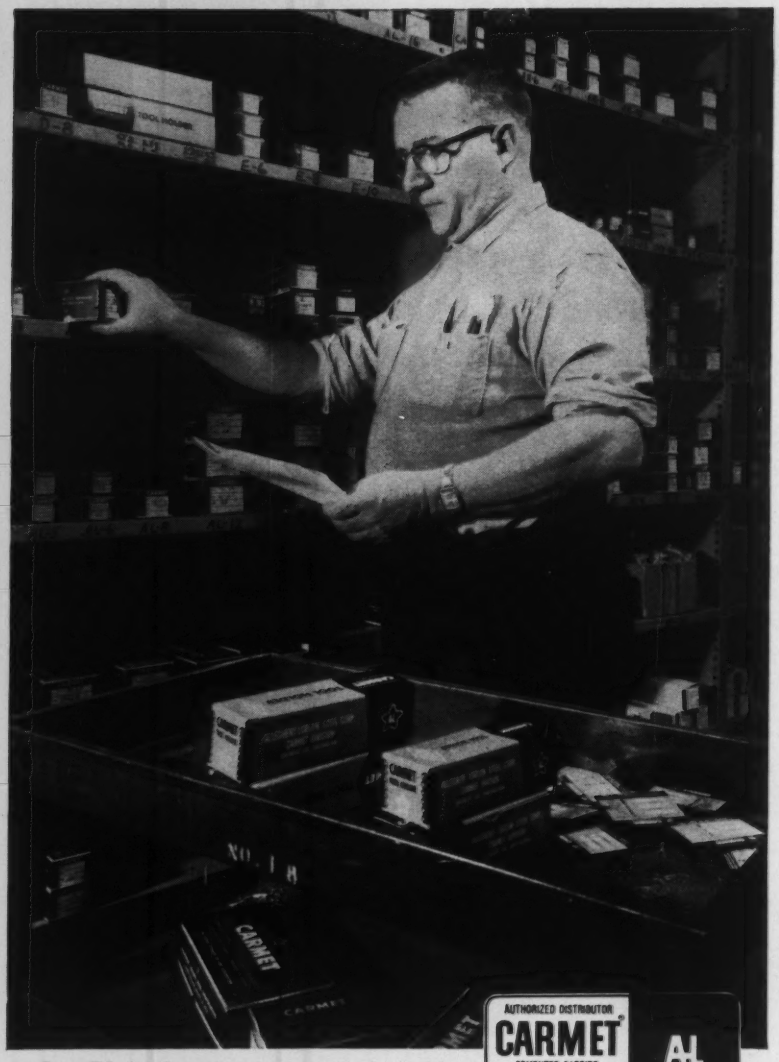

Over 75 distributors, coast to coast, display this sign—service in your own local area.

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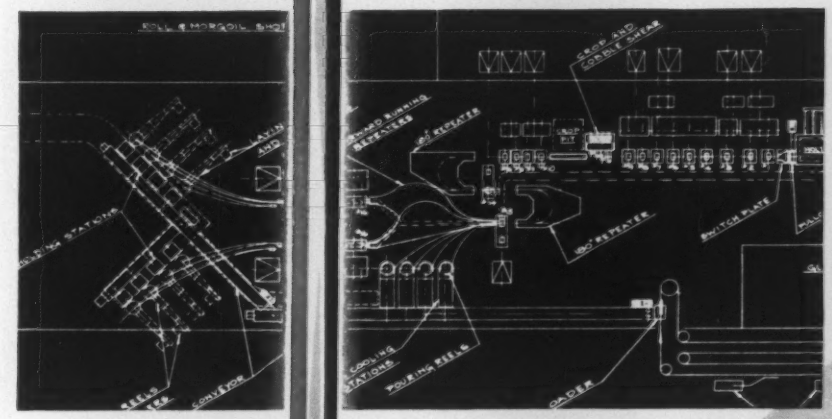
Your Customer's Requirements Draw the Specifications for MORGAN Rolling Mills



Today's market dictates a changing pattern of demand. And every tomorrow presents a challenge. Metals change—uses change—problems of labor change—innovations appear everywhere.

MORGAN utilizes up-to-the-minute creative engineering skills backed by 72 years of accumulated experience in the rolling mill field to make every *new* MORGAN MILL meet the demands of the future.

Each Morgan Mill starts with these basic questions, "What are your customer's requirements and, how can we do the very best job of helping you fill these needs?"

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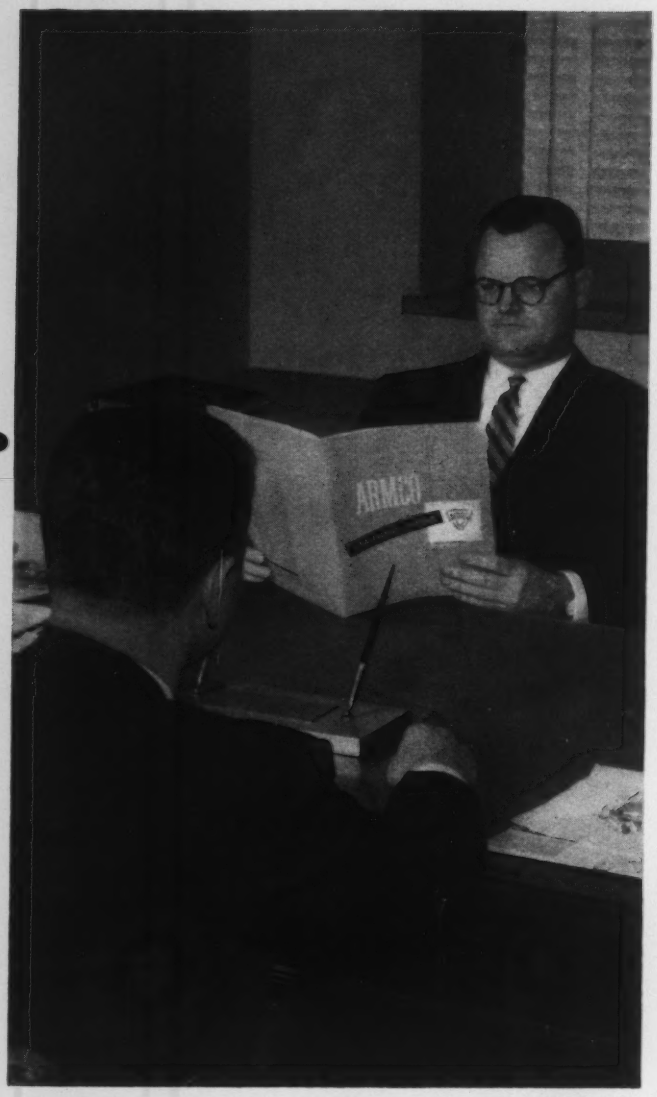
RM-82

New steels are born at Armco

18-8 STAINLESS Which type do you need?



Armco produces standard 18-8 (Type 302) Stainless Steel, of course. But we also supply a number of variations of this "18-8" analysis to meet your specific requirements.

For example, *Armco 18-8 Si* (Type 302B) contains added silicon for extra resistance to high temperature scaling. *Armco 18-8 FM* (Type 303) and *18-8 FM Se* (Type 303 Se) bars offer improved machinability. *Armco 18-8* (Type 304) minimizes harmful carbide precipitation during welding. And to assure virtual immunity to this condition, Armco developed still another analysis, *18-8 ELC* (Type 304L) with 0.03 per cent max. carbon.

More than 50 other grades

Besides these grades, Armco produces more than 50 additional varieties of stainless steels—from standard chromium and chromium-nickel grades to special precipitation-hardening stainless steels. They are available in sheets, strip, plates, bars, wire, billets, and in a wide range of gages, shapes, sizes, finishes and conditions.

Phone your nearest Armco Sales Office or Armco Stainless Distributor for complete data on any specific stainless grade. For general information about Armco Stainless Steels, just fill in and mail the coupon.

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South African Massacre: A Far-Reaching, Stupid Act!

We should be thankful our country had the national integrity to protest the recent massacre in South Africa. We should be even more grateful that our leaders acted on the basis of human dignity and humanity rather than taking a strictly economic tack.

It is a little late for others now to disclaim cautiously a strictly laissez-faire attitude. It is certainly right for the United Nations to look into this sorry mess. To say that what South Africa does in racial matters is no one else's affair comes close to saying that what Hitler did was no one's business. History proved different.

The sleeping giant of Africa is awake—and moving. What white people think this giant should or should not do is beside the point. The actions, experiences and heartaches of underdeveloped nations will shock the Western world time and time again.

For those who are ever ready to assume that "leaving well enough alone" is the best policy, all that can be said is that they are asleep. And when they awaken it might be too late.

From an economic standpoint, what happens in Africa, Mississippi, Caracas, Havana or Hong Kong is certainly our business. If not in the sense that we should act, then certainly in the sense that we will react. And, further, in the sense that our economic future will be affected.

Since many people are moved by economic factors, as well as by human factors, it might be well to view the South African fracas in that light. Other African nations will be moved emotionally over the plight of the black man in South Africa. That alone means vast changes in viewpoints, perhaps some speedups, and certainly a delicate balancing of relationship between colored and white statesmen.

There will be those who will decry our government's protest in view of our own national race problems. There is not now and can never be a parallel between our problems and the strident and senseless philosophy of apartheid.

It is said that many of the protests coming to light in South Africa against that government's actions are not based on man's humanity to man: They are based on strictly economic factors—or: What will this do to us?

Economic forces may in the long run do more toward correcting racial questions than the heart. But it is quite a commentary on the human race that this appears to be so.

Tom Campbell

Editor-in-Chief

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Forms Thin Chrome Coating

Three types of solid-liquid surfaces form through continuous cooling of a saturated solution of chromium in tin below the liquidus temperature. It's possible to produce 0.001-in. coatings of chromium which are soft, dense and smooth. Such coatings offer promise as a barrier substrate for spray coats.

Predict Rivet Deformation

A theory for predicting the transverse shear-creep deformation of a rivet in terms of pure torsional shear-creep is explained in a report just released by the U. S. Dept. of Commerce. The report shows how to obtain the creep deflection of a rivet from creep constants in pure shear or simple tension.

Human Factor Breakthrough

Research for space and high-speed flight uncovers a growing amount of knowledge regarding human reactions and abilities that should prove vitally important to industry. Results of these man-machine studies may bring about more productive machine tools, better industrial equipment and more efficient plants.

More Machine Tool Storage

The government's hoard of machine tools in storage continues to rise. In theory, the tools will be moved into production in time of war. However, there's growing doubt among military planners that many of these tools will ever be used. Meanwhile, this potential threat to the tool market (9700 tools by 1962) hangs over the industry's head.

New Alloy Suits Cathodes

Superior Tube Co., Norristown, Pa., has developed a new nickel-base alloy for cathodes. This alloy combines good electron-emission characteristics with low interface impedance and low sublimation rate. This provides long tube life under extreme conditions of high current and over-voltage. The new alloy contains 0.1-pct zirconium and 2-pct tungsten. Cathodes can be fired at 1300°F without softening.

Seek Flexible Tungsten

Researchers at the National Aeronautics and Space Administration have successfully treated tungsten to permit it to be bent. But once bent, it becomes brittle. They're still trying to develop a process to give it permanent flexibility. Their target is to make tungsten suitable for use as fuel in a nuclear reactor. If they meet this goal, it will cut down the weight and the cost of nuclear rockets.

Finish Resists Corrosion

Bright annealing is getting careful study by stainless producers as a means of meeting automotive requirements for corrosion resistance and bright finishes. The idea is to produce a surface that will meet severe corrosion tests—yet requires a minimum of buffing to produce the desired finish.

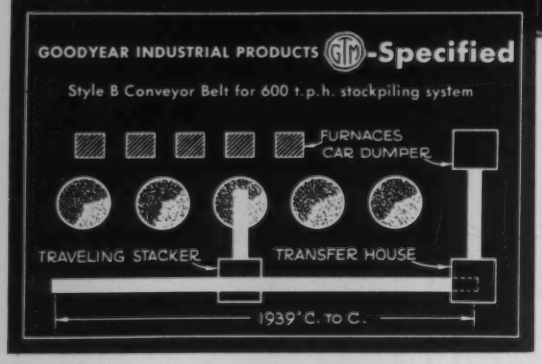
Flux Yields Strong Welds

A new welding flux promises to lower production costs in the construction of submarine hulls. The newcomer contains little silica and a large amount of calcium oxide. Using this flux and commercial wire, workers produce welds with a yield strength of 90,000 psi, ultimate strength of 100,000 psi, with good ductility and notch values of 30 ft-lb at –100°F.

Production Vacuum Furnace

Continuous processing of ceramic electron tubes occurs in a vacuum furnace, developed by the National Bureau of Standards. Tubes are placed in a carrier which proceeds through a vacuum system, where the parts are heated, evacuated, degassed and hermetically sealed. The high temperature brazes together the metallized surfaces of the ceramic wafers to seal the units.

The old elevated rail-cars were a bottleneck at this big Eastern steel mill. Besides, using this manually operated ore dumping system, it was costing too much to move material to the various stockpiles. A conveyor belt looked like the answer, and on the recommendation of the G.T.M.—Goodyear Technical Man—the new system was equipped with a rugged 48-inch Style B Belt. It's muscled with heavy, multi-ply fabric for just such demanding duty. And the result? Operating with a traveling stacker, the G.T.M.'s belt handles the materials at 600 t.p.h. on an average—up to 1,000 t.p.h. when pressed. Moneysavings over the first 5 years? Mill management figures them at better than $50 per operating hour—a 15% cut in cost over previous stockpiling methods.



The G.T.M. is the man with a knack for ferreting out possible economies—wherever industrial rubber products can do the job.

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Quenching a Thirst

As foreign metalworking industry grows, so does the foreign technician's thirst for knowledge on how American metalworking operates.

And the IRON AGE is one of the leaders in quenching this thirst.

World-Wide — Copies of recent issues have been placed in commercial libraries in Pakistan, India, Guinea, Sierra Leone, Japan, Liberia, Ghana, United Arab Republic, the Philippines, Peru, Brazil, Federation of Rhodesia and Nyasaland and Germany.

They are carefully read and digested, especially articles written by our editors on industry conditions, price trends, new products and developments, marketing techniques, and sources of supply.

Advertising Pays—Another area that is well read is the advertising. Reports from the U. S. Dept. of Commerce, say that IRON AGE ads are read "eagerly" and with broad interest.

WIDE INTEREST: Indian industrialists carefully examine a copy of The IRON AGE at the U. S. Trade Information Center, New Delhi, India.

Ole Man River

Soon another shipping era will come to an end. The stern-wheeler steamer Homestead, owned by U. S. Steel Corp., will go into retirement and become a river museum.

In true spirit of the riverboat era, the Homestead played a glamorous role to the end. But modernization and the advent of the diesel engine have caused its retirement.

Built in 1922, the vessel was named after U. S. Steel's Homestead Works. Its job was to push coal barges from mines along the Monongahela River to the Clairton Works.

Power and Glory—But some of its greatest days came just a few years ago. The Homestead is one of the last racing steamboats. And, one of the best. In 1949 it raced Jones & Laughlin Steel Corp.'s William Larimer Jones on the Ohio River and won. A year later it raced J&L's Titan. Again the Homestead won. The prize was an expensive silver replica of a riverboat.

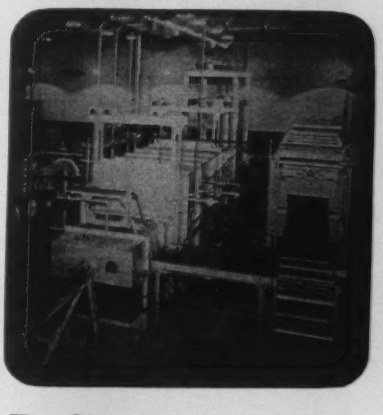
But one of the greatest races of all took place in 1951. The Homestead again raced the William Larimer Jones. And both riverboats were underway at full steam. The battle was nip and tuck all the way from the starting point where the Ohio forms to a bridge crossing the Monongahela in Pittsburgh.

Disputed Victory—As the boats neared the finish line cheers rose from both camps. Each side was convinced its boat had won. And, as a matter of fact, they are still arguing about it. So confused was the outcome that the trophy was held by U. S. Steel for six months, and then by J&L for another six.

Journey's End—In all the races the riverboats pushed barges. Not to make the race more competitive, but rather to keep the boats afloat. Having flat bows, they would have swamped as they picked up speed.

But, now with its days of glory behind, the Homestead will take a permanent berth near the mouth of the Ohio.

LABOR SAVED 50%
PRODUCTION UP 50%



R-S . . .
CONTINUOUS HARDENING, QUENCHING, DEGREASING, DRAWING LINE

It's one operation instead of four to heat treat cylinder liners at Continental Motors with the R-S equipment. Electric heat treating line is one complete unit ...temperature is 1575° F. for hardening, it is oil quenched and the draw furnace operates at 1100° F. The atmosphere is controlled through hardening and quenching operations and capacity is 1,300 gross lbs. per hour.

R-S Heat Treating unit requires only two men instead of four with the conventional type. Production rate is up 50% . . . quality is uniformly high . . . and the unit paid for itself in 22 months.

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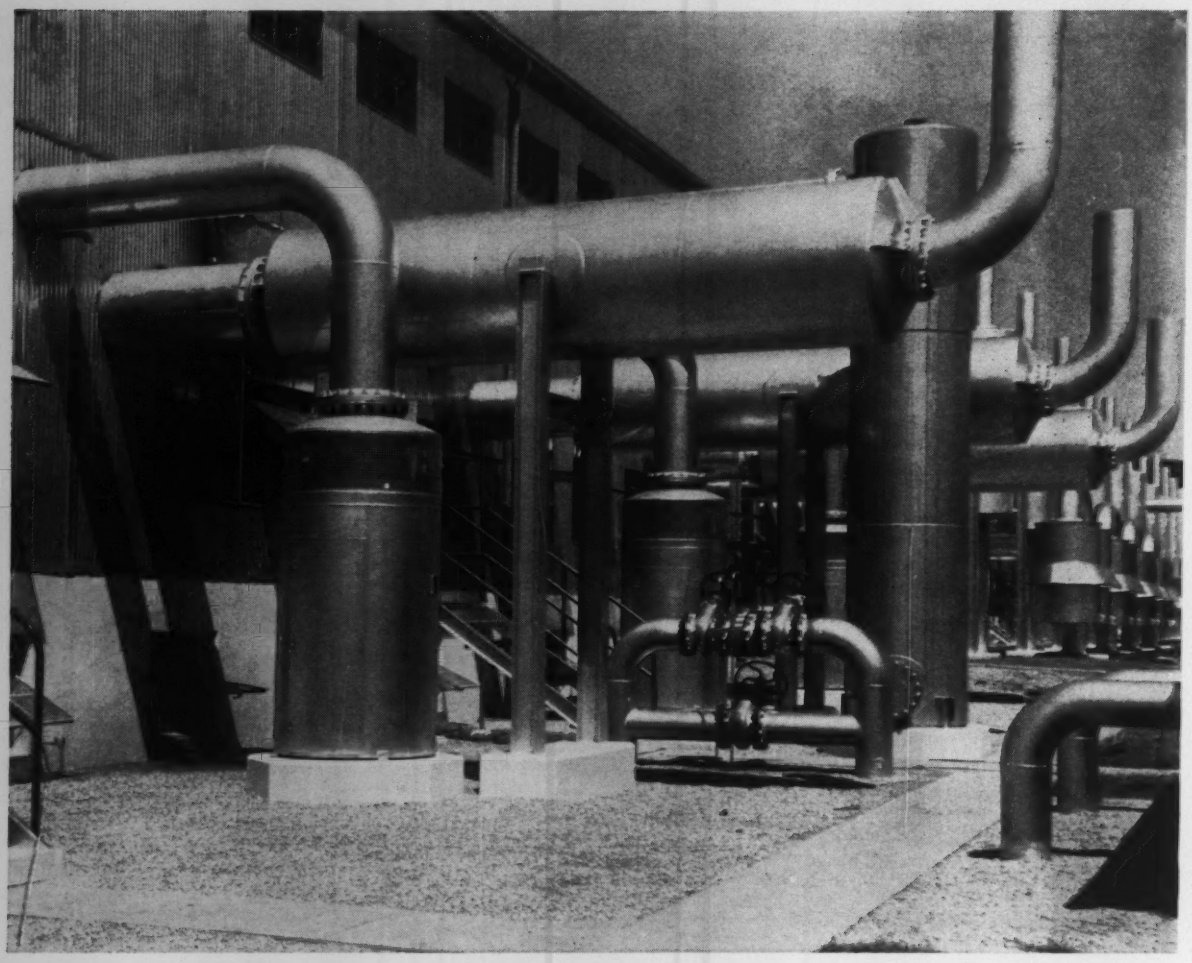
R-S FURNACES



"Sound Engineering"
pays off with precision stampings

Silencing high-energy exhaust gases from powerful stationary engines calls for snubbers that can take years of explosive pressure without mechanical failure.

Burgess-Manning Snubbers handle the job with a heavy-gauge cylindrical pressure vessel type construction, continuously welded throughout. Their scientifically engineered multiple chambers prevent, rather than muffle, noise by converting exhaust "slugs" to a continuous flow.

Ends of these cylindrical vessels must meet the same exacting standards. And, Burgess-Manning relies on COMMERCIAL for the ends of their snubbers.

COMMERCIAL'S complete facilities prove a dependable "one source" with dies in existence to cover Burgess-Manning's entire size range requirement. Diameters 24", 30", 36", 42", 48", 54", 60" and 72"—each in proper thickness to meet any pressure requirement.

Through its extensive "Die Bank", COMMERCIAL has made its standard metal shapes available to O.E. manufacturers for over 30 years. Drawing from over 20,000 components, dies can be assembled to form economical metal component parts having higher functional efficiency. Many unusual parts have been put up to COMMERCIAL to produce which, with slight modification to fit the "Die Bank" pattern, have resulted in customer cost benefit. Specials often require only partial tooling cost.

COMMERCIAL engineering assistance is always available to help you make the most advantageous use of this important service. Before starting your next job, write for Catalog 200-C1 which details all standard shapes and dimensions available. Address: Commercial Shearing & Stamping Company, Dept. K-17, Youngstown 1, Ohio.

Specialists in the shape of things to come
CUSTOM STAMPING • UPSET FORGING • ROTOFORMING

COMMERCIAL
shearing & stamping

A Request

Sir—May I have permission to print for distribution to our 180 employees, Mr. Campbell's excellent editorial of March 17 "The Five Percenters: How Do They Get That Way?" I always thrill to his editorials and would like to share some of them with our people!—A. J. Suiter, Pres. & Gen. Mgr., U. S. Supply Co., Kansas City, Mo.

Permission granted.—Ed.

Microfilm System

Sir—We would like to have two sets of reprints of the article "Microfilm System Sends Data to World-Wide Locations," in your March 31 issue. We should also like to have your permission to reproduce this material, with proper credit, for distribution to our manufacturing affiliates overseas, where we are trying to promote the use of similar systems.—John Perry, International General Electric Co., New York.

Reprints have been sent. Permission is granted.—Ed.

Professional Employees

Sir—If it is available we certainly would appreciate one copy of the special report on page 61 of the March 17 issue "Do Professional Employees Require Special Handling."

We find your editorial articles much better than those usually found in the technical journals.—P. M. Nawn, Development Engr., Line Material Industries, McGraw-Edison Co., Milwaukee, Wisc.

A copy is in the mail.—Ed.

Coated Metals

Sir—Your recent article "Coated Metals with Nonmetallic Finishes" is very interesting. I would appreciate your forwarding six reprints of the article for distribution in this office.—David Luria, Vice Pres., Luria Engineering Co., Bethlehem, Pa.

Reprints are on the way.—Ed.

Wrong Figure

Sir—We were very pleased to see your reference on page 134 in the March 31 issue of The IRON AGE to Robertshaw - Fulton Controls Company's new $4-million plant at New Stanton, Pennsylvania. Robertshaw-Fulton is one of our clients.

However, we regret to have to point out to you that the New Stanton plant itself will not have a manufacturing capacity in excess of $110-million as is stated in your item. The $110-million figure refers to the manufacturing capacity of all the plants of Robertshaw-Fulton Controls Company. This capacity will compare with net sales in 1959 of $79,494,038.—C. R. Harrower, Vice Pres., Gartley & Associates, Inc., New York.

Our apologies.—Ed.

Information, Please

Sir—I would like some information on the heat treatment of "Corvair." We do not have a listing on this steel and it is not listed in your 27th edition of AISI classifications.—Othmer Chelstrom, Minneapolis, Minn.

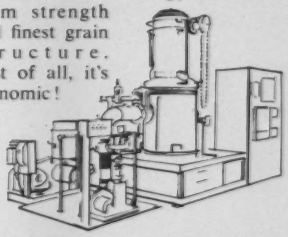
Perhaps a reader can help.—Ed.

"5—4—3—2—Hold it!"

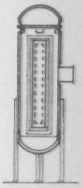
WESLEY R. GILBERT, Hayes Chief Engineer, tells about the . . .

"VACUUM AGE" OF HEAT TREATING

A major New York manufacturer of aircraft equipment recently reported their Hayes Vacu-Master Cold Wall Furnace was paying off in many ways — providing rapid cycling, simplified work handling, and complete production flexibility. Additionally, the vacuum furnace has eliminated need for atmosphere equipment . . . and produced work (stainless steel brazing) of maximum strength and finest grain structure. Best of all, it's economic!

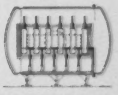


Similar Success Stories come to us from other users of Hayes Furnaces. Successful heat treating of "exotic" metals (tantalum, titanium, niobium, etc.) in the 2600 to 4500°F range. Successful sintering, hardening, annealing, and degassing at high production rates. Success stories all around!



The "Universal Atmosphere" has Universal Applications

Unlike other "atmospheres," vacuum has virtually no job limitations. Here's where the ingenuity of Hayes development engineers comes into play. By coordinating furnace design with job requirements . . . and by PROVING RESULTS in the Hayes lab . . . Hayes vacuum furnace engineers assure the customer a "RESULTS GUARANTEED" installation every time. I'd like to invite you to advance your heating into the "vacuum age" . . . with HAYES!



Write for vacuum Bulletin 5709A.

C. I. HAYES, INC.

Established 1905

821 Wellington Ave. • Cranston 10, R. I.

ELECTRIC VACUUM FURNACES

It Pays To See Hayes for metallurgical guidance, lab. facilities, furnaces, atmos. generators, gas and liquid dryers.

The Prime Mover Company, manufacturer of materials handling equipment, says:

Our "Prime Movers" give these 6 parts a terrific beating...that's why they're made of LaSalle

Engineers of the Prime Mover Company, Muscatine, Iowa, demanded the most dependable steel bars available for six important parts of their transmission assembly. Here are some of the reasons they specified STRESSPROOF!

You don't have to heat treat STRESSPROOF! There's no heat treat distortion.

STRESSPROOF is strong . . . 100,000 psi.

It machines faster . . . at 83% the speed of B1112.

It wears better without case hardening . . . replacing .40 carbon alloy steels and other heat treated and alloy steels, such as 8640, 4140, C1045, C1141, and C1137.

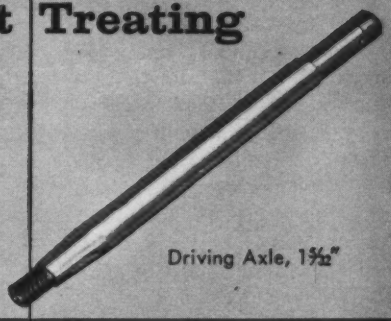
It costs less than heat treated in-the-bar alloys.

STRESSPROOF®
STEEL BARS

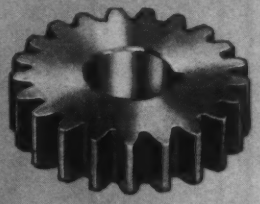
with copper
Strength Without Heat Treating

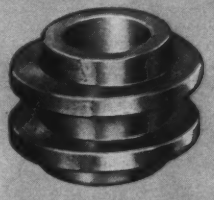
Worm Shaft, 1½"

Input Shaft, 1 5/32"


Driving Axle, 1 5/32"

Shifting Shaft, ¾"

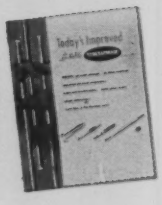

Reverse Pinion, 3"


Bearing Carrier
Clutch Throwout, 2¼"

Use this coupon to request technical bulletin announcing improvements in LaSalle STRESSPROOF *Steel Bars...with copper.*

La Salle STEEL CO.

1436 150th Street
Hammond, Indiana



Please send technical bulletin "Today's Improved LaSalle STRESSPROOF Steel Bars...with Copper."

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

COMING EXHIBITS

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Powder Metallurgy Show — April 25-27, Drake Hotel, Chicago. (Metal Powder Industries Federation, 60 E. 42nd St., New York.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

1960 Castings Congress & Exposition—May 9-13, Convention Hall, Philadelphia. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

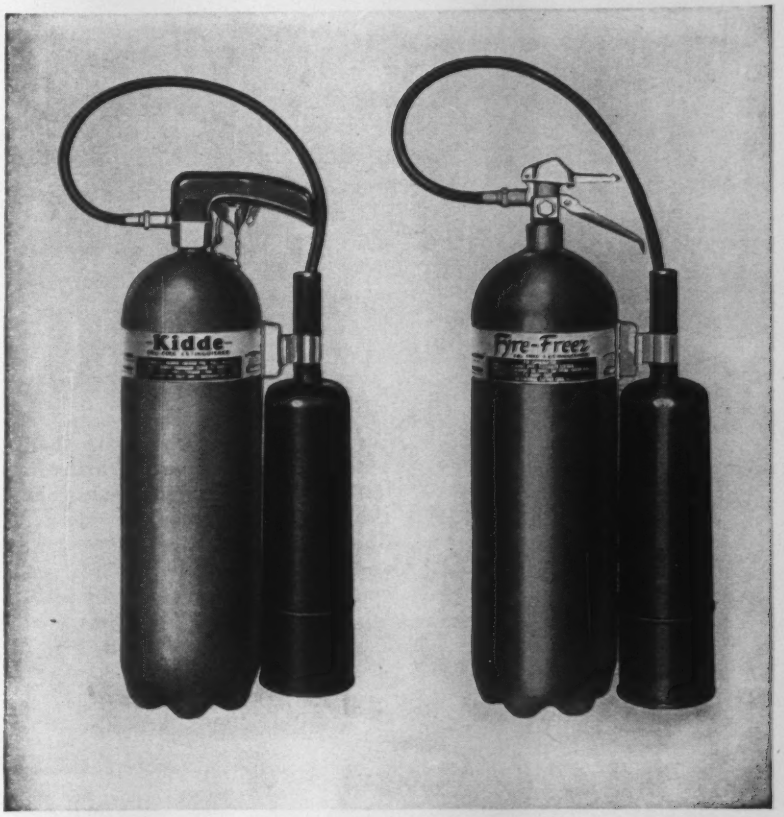
MEETINGS

APRIL

American Ceramic Society — Annual meeting, Apr. 24-28, Bellevue-Stratford Hotel, Philadelphia. So-

(Continued on P. 16)

New Kidde carbon dioxide portables awarded highest U.L. rating!



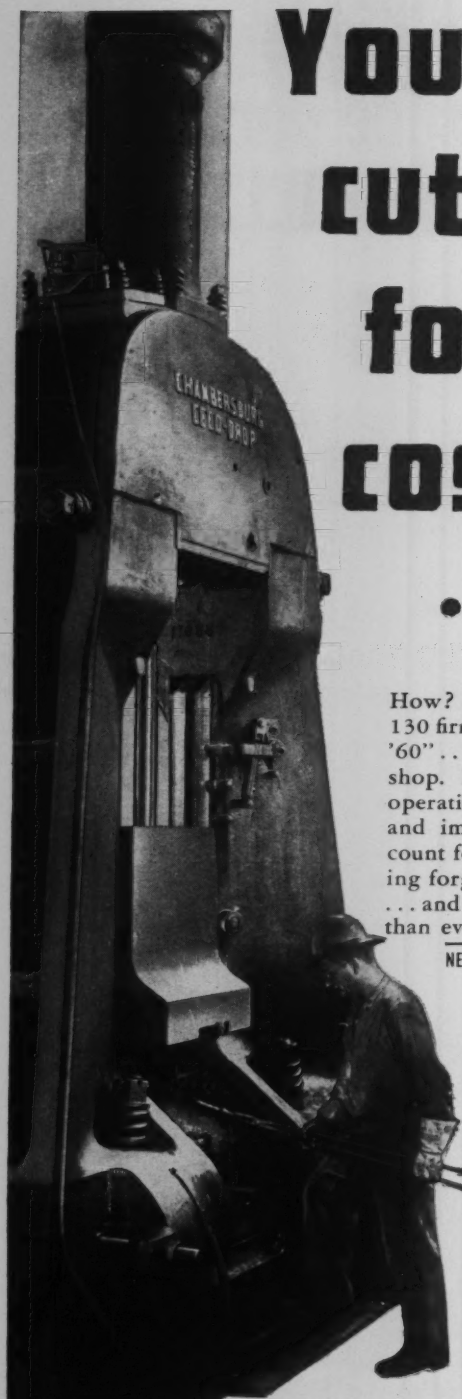
Belleville, N. J. — A spokesman for Walter Kidde & Company announced here today that four of the company's new portable fire extinguishers have been awarded the Underwriters' Laboratories highest ratings for their respective capacities. To those interested in fire safety, this means that, pound for pound, these new Kidde units have more fire-killing power than any other carbon dioxide extinguishers on the market today.

Available in 15 and 20 pound capacities, in either squeeze valve or trigger models, these power-packed Kidde units feature new hose and discharge horn assemblies, which are responsible for their extra fire fighting ability. The new assembly is supplied also with Kidde's 10 pound carbon dioxide portable which has a U. L. rating not exceeded by any other extinguisher of its capacity. This hose-horn combination is also being offered as a replacement unit for existing 10, 15 and 20 pound carbon dioxide units, and when attached will upgrade their effectiveness equal to the new ratings.

For more information on these top-rated Kidde carbon dioxide portables write Kidde today.

Kidde (K Kidde)

Industrial and Marine Division
Walter Kidde & Company, Inc.
449 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd.
Montreal — Toronto — Vancouver



You can cut your forging costs in • 1960

How? By joining the more than 130 firms who are being "thrifty in '60" . . . install Ceco-Drops in your shop. Higher production, lower operating and maintenance cost, and improved safety features account for its endorsement by leading forge shops all over the world . . . and today's Ceco-Drop is better than ever!

NEW FEATURES ON TODAY'S CECO-DROPS

1. New Die-setting Ram Control, which makes die-setting easier and safer. Operator can raise or lower ram at will with no danger.
2. New Double Acting Non-slip Rod Clamp, which improves rod clamping. Faster action makes hammerman's job easier.
3. New Nylon-cushioned Stroke Control, which reduces shock to valve control rigging, and reduces wear on ram incline.

Write for 28-page bulletin, "The Ceco-Drop and its place in Forge Shop Modernization"

•

CHAMBERSBURG ENGINEERING CO.
Chambersburg, Penna.

CHAMBERSBURG

○ The Hammer Builders •

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

When it's a vital part, design it to be FORGED

ciety headquarters, 4055 N. High St., Columbus 14, O.

Metal Powder Industries Federation—Annual meeting, April 25-27, Drake Hotel, Chicago. Headquarters, 60 E. 42nd St., New York.

Association of Iron & Steel Engineers—Spring meeting, April 25-27, Sheraton Hotel, Philadelphia. Association headquarters, 1010 Empire Bldg., Pittsburgh.

Metal Lath Mfrs. Assn. — Spring meeting, April 28-29, Hotel Tropicana, Las Vegas, Nev. Association headquarters, Engineers Bldg., Cleveland.

MAY

National Assn. of Architectural Metal Manufacturers—Annual convention, May 1-7, Boca Raton Hotel & Club, Boca Raton, Fla. Association headquarters, 228 N. LaSalle St., Chicago.

Wire Assn. — Regional meeting, May 4-5, Sheraton Hotel, Philadelphia. Association headquarters, 453 Main St., Stamford, Conn.

American Institute of Steel Construction, Inc.—Engineering conference, May 5-6, Brown Palace Hotel, Denver. Institute headqaurters, 101 Park Ave., New York.

National Machine Tool Builders Assn.—Spring meeting, May 5-6, The Roosevelt Hotel, New York. Association headquarters, 2139 Wisconsin Ave., N. W., Washington, D. C.

National Fluid Power Assn.—Spring Meeting, May 8-12, Grand Hotel, Point Clear, Ala. Association headquarters, 5595 N. Hollywood Ave., Milwaukee.

Machinery Dealers National Assn.—Annual convention, May 11-14, Edgewater Beach Hotel, Chicago. Association headquarters, 1346 Connecticut Ave., N. W., Washington 6, D. C.

GENERAL ELECTRIC
Offers a Complete Line of

ADJUSTABLE-SPEED DRIVES

MECHANICAL
ELECTRIC
ELECTRONIC

TO MEET EVERY APPLICATION REQUIREMENT

Horsepower
1/4 to 1250

TIMED OR CURRENT LIMIT
Acceleration or Deceleration

OPERATES FROM AC POWER SOURCE

R. P. M.
2 to 6000

SPEED RANGE
Up to 200:1

SPEED REGULATION
10% to 0.1%

Constant HP
Constant Torque
Or Both

Remote Preset Speed Control

SELECT YOUR DRIVES *from*
General Electric's Complete Line
Shown on the Following Pages

GENERAL ELECTRIC

GENERAL ELECTRIC

Adjustable-Speed Drives Offer **A Great Opportunity**

POLYDYNE® DRIVE

Modern, a-c mechanical drive. ¼–25-hp. Speed range to 10:1. New "Equalizer"‡ provides smooth manual or automatic speed control. Produced by Gear Motor & Transmission Components Dept., Paterson, N. J. Write for Bulletin GEA-6806*.

‡ Pat. Pending.

KINAMATIC® *Speed Variator*

Industry's most versatile electric drive. 1–500-hp. Features Kinamatic motor-generator conversion. Speed range up to 200:1. Precise regulation. Regeneration. Wide variety of power unit, motor and control modifications available. Write for Bulletin GEA-6643*.

THYMOTROL® *SPEED VARIATOR*

High quality electronic drive. ¾–10-hp. Wide speed range. Small, lightweight. General Purpose and High Performance types. Write for Bulletin GEA-7018 and GEA-7019*.

Industry's most complete line of modern packaged drives for every performance level, every price range

General Electric adjustable-speed drives are available for every performance level, every price range to help you boost output, improve quality, increase machine flexibility, reduce installation costs, cut your maintenance budget, add substantial profits to your business.

To make possible these advantages, your General Electric sales engineer is backed by an experienced team of adjustable-speed drive specialists—men who work constantly to help you get more out of your machines.

They offer an unbiased, analytical evaluation of your requirements—recommend the adjustable-speed drive that meets the demands of your application most completely and economically.

GENERAL ELECTRIC

to Modernize for Increased Profits

KINATROL✣ SPEED VARIATOR

Outstanding packaged drive value. Compact, versatile eddy current coupling. 3–100-hp. Stepless speeds 1½:1 to 17:1. 2% speed regulation. For complete information write for Bulletin GEA-6885*.

Parmatic SPEED VARIATOR

Power amplistat conversion features hermetically sealed silicon rectifiers. 1–200-hp. Speed ranges to 200:1. Lightweight, quiet and vibrationless. Field proven. Write for Bulletin GEA-7012*.

** Write to Section 821-4, General Electric Company, Schenectady 5, New York.*

In Canada, write Canadian General Electric, Peterborough, Ontario.

✣ Trademark of General Electric Company.

RESEARCH

In product research, G.E. invests more than three times the industry average. You benefit from the most modern features in your G-E drive.

ENGINEERING

General Electric industry and application specialists, familiar with your production process, assure proper selection and design of G-E adjustable-speed drives to meet your specific application requirements.

MANUFACTURING

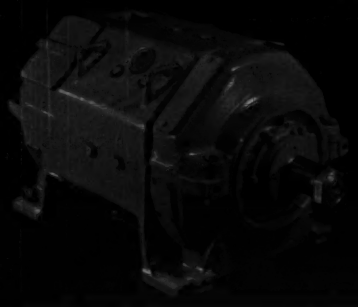
Skilled G-E workers, modern production facilities, standardized components and latest testing methods combine to give you high-quality, adjustable-speed drive equipment, shorter delivery time, lower prices.

SERVICE

G.E.'s service network offers three-way 'round-the-clock' assistance: start-up service, productive maintenance assistance and complete repair service.

MD ARMORED MOTORS

Industry's most preferred d-c mill motor. 500 to 625-hp. Write for Bulletin GEA-4654C*.



KINAMATIC D-C MOTORS

Most modern, versatile d-c motor for adjustable speed. 1 to 200-hp. Write for Bulletin GEA-6335*.

AMPLIDYNE POWER AMPLIFIERS

Fast response d-c power source with flexible output characteristics. Write for Bulletin GEA-4053B*.

PLUS . . . industry's most complete line of drive components for both general purpose and special industry application

To learn more about the modern capabilities of G-E packaged drives and components, call your nearby General Electric sales engineer. ADJUSTABLE SPEED, a new booklet which outlines G.E.'s complete line of modern packaged adjustable-speed drives, is also available to help you modernize for profits. Ask for Bulletin GEA-6999*.

**** Write to Section 821-4, General Electric Co., Schenectady 5, N. Y. In Canada, write Canadian General Electric, Peterborough, Ontario.***

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HEAVY DUTY M-G SETS

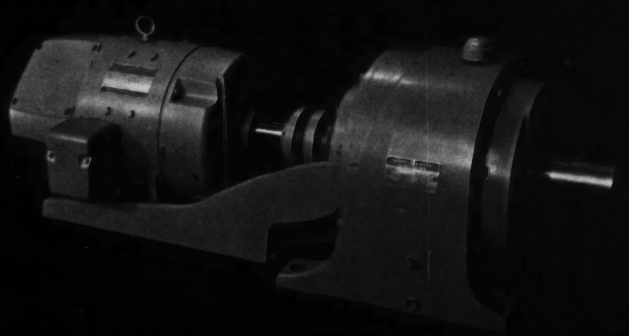
Reliable power conversion for main, auxiliary and process line drives

CD-1000 D-C MOTORS

Performance proved. Quality designed. 250 to 1250-hp. Write for Bulletin GEA-5497A*.

ALL-MOTOR GEAR-MOTOR

A-c or d-c. 1 to 75-hp. Simplified maintenance. Produced by Gear Motor & Transmission Components Dept. Write for Bulletin GEA-6704*.



ANNOUNCING

NEW GISHOLT 3F FASTERMATIC WITH *FeeDial* CONTROL

IN JUST 15 MINUTES!

...then set your tools and take your trial cuts. That's how fast and simple it is to set up the new Gisholt MASTERLINE 3F FASTERMATIC Automatic Chucking Turret Lathe!

Only 15 minutes to pre-select feeds, speeds and functions—Now the desired feed rate is individually selected for each tooling station by turning a dial control. Selection of spindle speeds and machine functions is equally fast—just flick toggle switches. You do it all in just 15 minutes.

Completely automatic—But your savings don't end with fast setup. The automatic cycle assures consistent quality at fixed production rates. Any operator, even a new man, can chuck the work, start the cycle and remove the finished part. He has ample time to handle another machine.

What's more fast setup makes the new 3F pay off big on machining small lots—25 to 50 pieces—as well as long production runs. Contact your Gisholt Representative, or write us.

Send for literature—Ask your Gisholt Representative to show you how this new 3F with *FeeDial* can cut costs on your work.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

MMT=PE

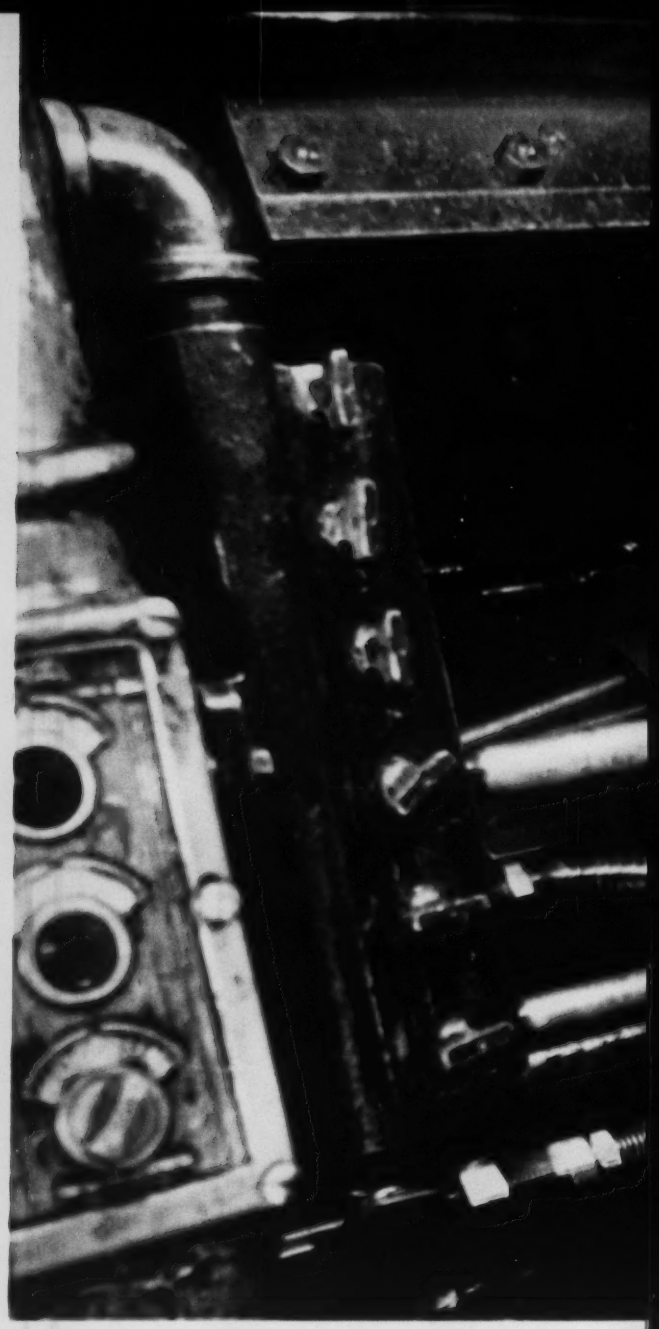
Turret Lathes • Automatic Lathes
• Balancers • Superfinishers • Threading Lathes
• *Factory-Rebuilt Machines with New-Machine Guarantee*

Investigate Gisholt's Extended Payment and Leasing Plans

Irving Hunt, left, Secretary of Holt Products Company, and H. F. ("Herm") Johnson, Gulf Sales Engineer, discuss savings resulting from use of Gulfcut 31C.

Section of the modern automatic screw machine department at Holt Products Company, Holt, Michigan. Machining small precision parts, Holt gets superior results with Gulfcut 31C.

Job pictured here: cutting spacer blocks for plow manufacturer. Material: 1⅛" bar stock steel. Tolerances: ±.0005". Feed: .0006 ipr. Production: 340 spacer blocks per hour. Tool grinding required only once a shift. Finish: excellent.



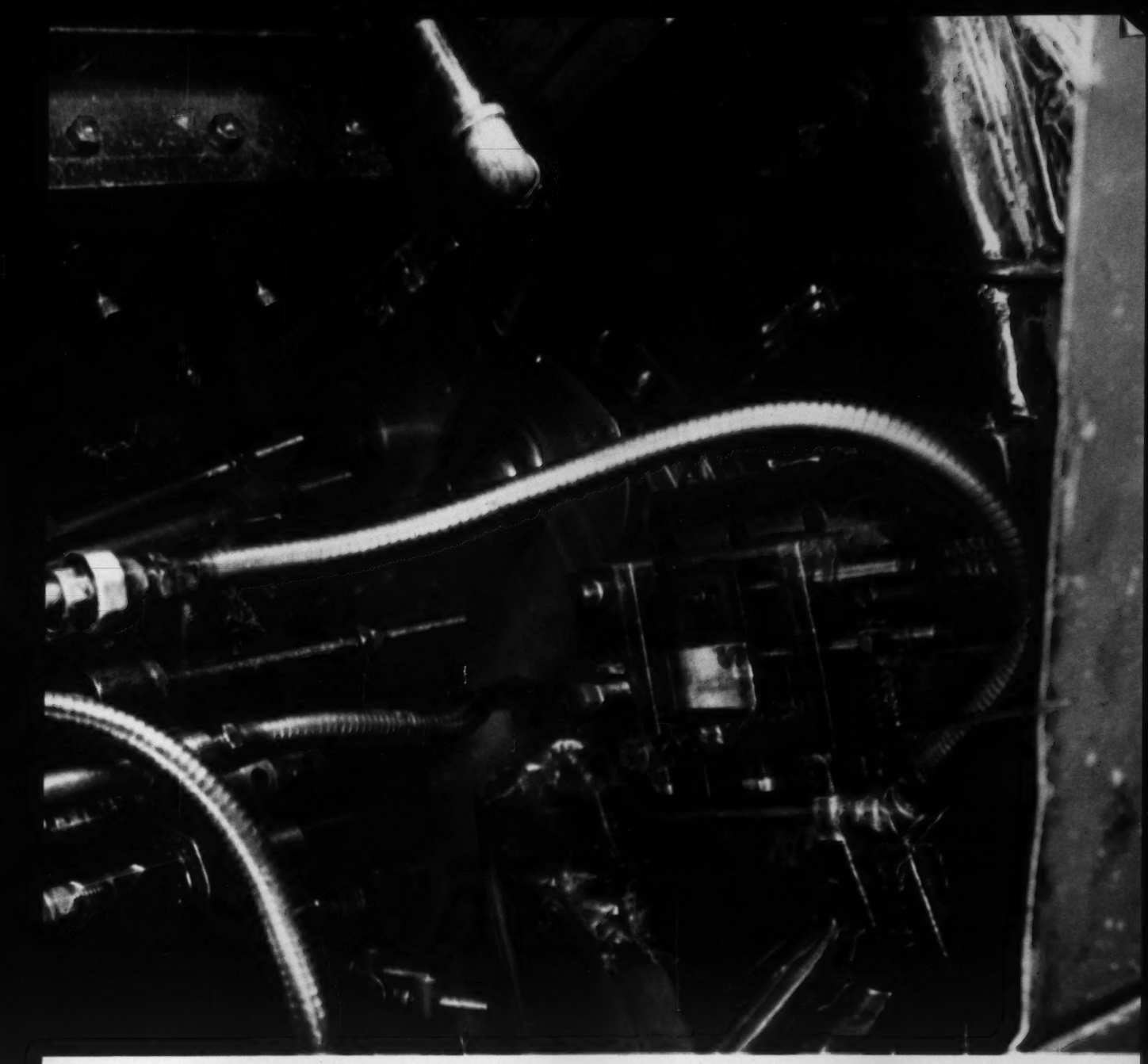
Replaces 6 oils with Gulfcut 31C, cuts machining costs 15%...

GULF MAKES THINGS

Three years ago, Holt Products Company, Holt, Michigan, producer of precision industrial, automotive and agricultural parts, was using six different cutting oils in automatic screw machine and turret lathe work. Here was a chaotic and costly inventory problem which Holt Secretary Irving Hunt was eager to eliminate.

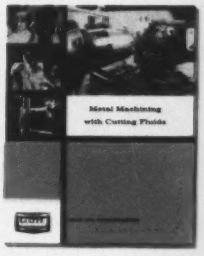
Acting on a Gulf Engineer's recommendations, Holt switched to just one cutting oil for all requirements. That one is Gulfcut 31C, a sulfurized mineral-lard oil possessing heavy load-carrying and anti-weld properties. Today, Mr. Hunt says, "Not only are we saving money by standardizing on this one superior cutting oil, but we are producing better work than ever, with few rejects. The increase in production and the longer life of our high-speed tools have meant a saving of at least 15% in over-all machining costs."

Perhaps some of your inventory and machining problems can be solved by one or more of the outstanding



RUN BETTER!

oils in the complete Gulfcut line. See for yourself how Gulf makes things run better! Just call a Gulf Sales Engineer at your nearest Gulf office. Meanwhile, send for your free copy of "Metal Machining with Cutting Fluids," the new 116-page handbook on their selection and use.



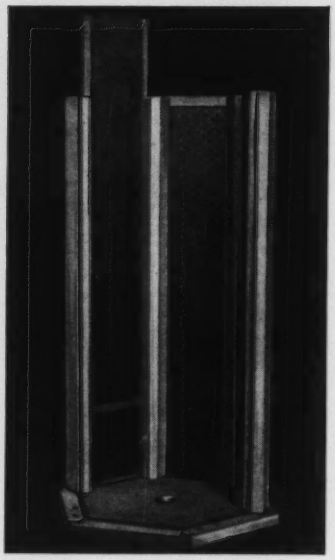
GULF OIL CORPORATION
Department DM, Gulf Building
Pittsburgh 30, Pennsylvania

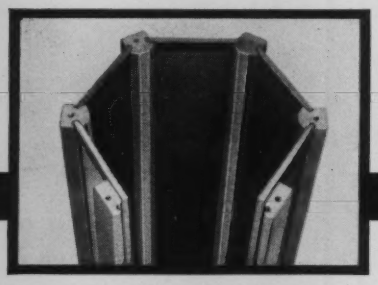
GULF

SP-9785

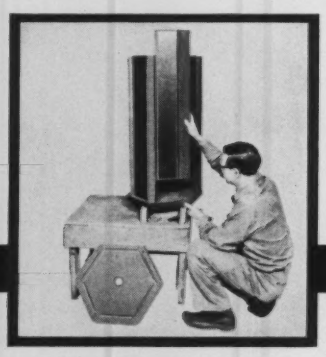
YOU GET SIX BIG BARREL BENEFITS with this new Udylok-Tempron assembly

A plating cylinder so simple in construction . . . you can count on its long life expectancy and repair any damage with ease.

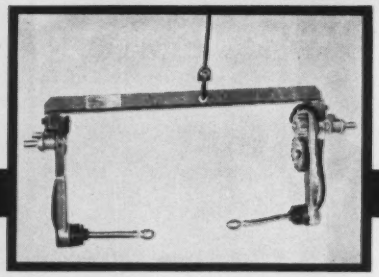




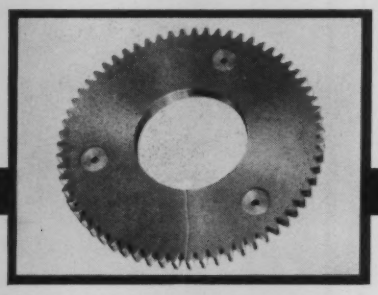
NEW INTERLOCKING CONSTRUCTION—No corrodible tie rods to rattle, work loose or get in the way . . . no old fashioned cemented joints. Exclusive interlocked rail and joint construction employs just 12 parts . . . no metal that will plate up in the entire cylinder unit.



NEW FIELD REPAIRABLE DESIGN—Standard parts are available from Udylite stocks, or you can stock spare parts and make your own repairs easily and rapidly with just a hammer and screwdriver . . . return cylinders to production in minutes.

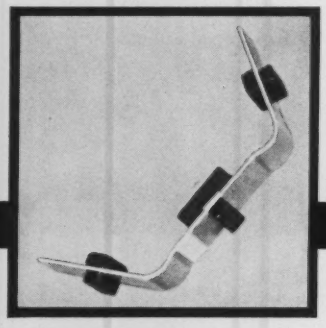


NEW UDYBILT SUPERSTRUCTURE—Combines new principle, dependable 4 saddle positive contact with 3 point suspension . . . never any misalignment . . . no arcing . . . gears are always in mesh . . . no jumping. Can be used with old style cylinders and in your present tanks.

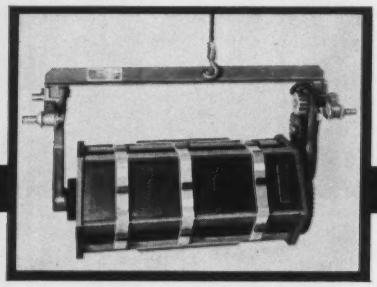


NEW UDYLON RING GEAR—New four pitch gearing provides greater-than-ever strength and durability. It's super corrosion resistant . . . will not plate up . . . inert to all solutions. *New low list price, too.*

NEW BELT DRIVE . . . Udylok is also available with an improved belt-drive-hanger. For additional information about either model, consult your Udylite man today or write:



NEW FIBERGLASS DOOR CLAMPS—Special epoxy-fiberglass composition . . . engineered for extra strength . . . they're flexible, lightweight, impervious to heat, cold and corrosion. NO METAL PARTS. Nearly indestructible, even under abuse.



HIGH WORK LOAD and current capacity. Easy to repair, economical in initial cost and maintenance, the Udylok assembly is loaded with buyer benefits. When you switch to Udylok in your plant you make the perfect economy move.

the udylite corporation

detroit 11, michigan

world's largest plating supplier

on the west coast the: **L. H. Butcher Company**

LIGHTER WEIGHTS FOR A **HEAVIER PROFIT**

Order a ton of stainless steel sheets and you receive a ton of stainless steel. But the square footage of that steel can differ.

Eastern's precision rolling holds the gauge toward the light side of recognized tolerances . . . actually delivers more area of stainless per ton. Result: Since you sell by the square foot, you earn more dollars per sale.

There's a profit in precision rolled stainless from Eastern.

EASTERN

STAINLESS STEEL

BALTIMORE 3, MARYLAND, U. S. A.
stainless steel sheets, plates, strip, coils

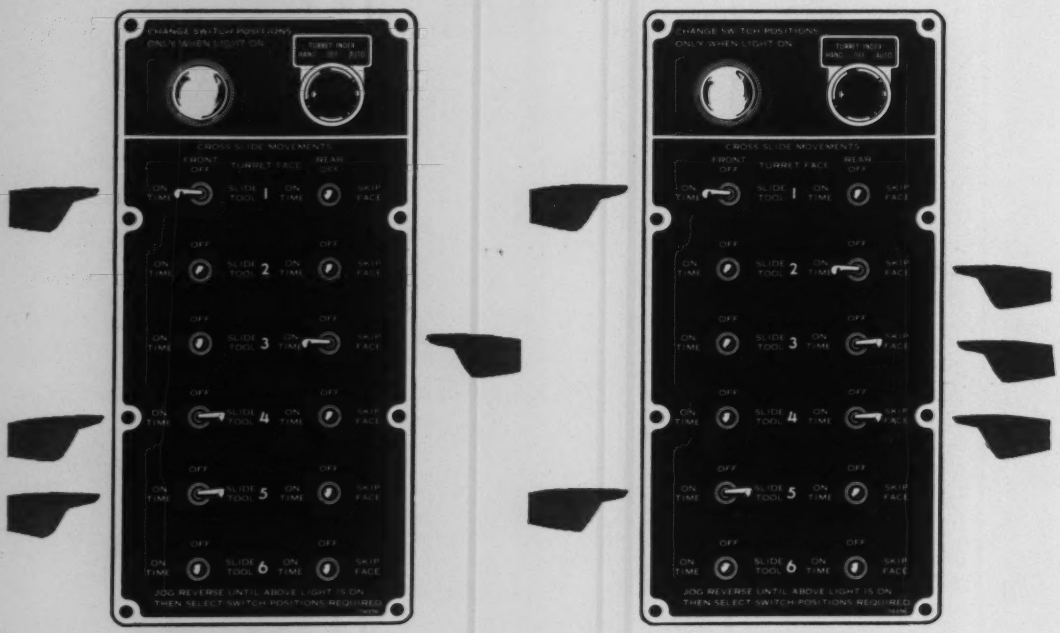
P&J means Profitable Jobs...

...RE-EQUIP WITH A

AN ALL-NEW MACHINE . . . WITH ALL THE

NEW SELECTOR SWITCH CROSS SLIDE CONTROL

This new control system lets you set all cross slide movements by merely operating selector switches. There are no covers to remove or replace, no pins or rolls to relocate. Setup is much faster and easier . . . programming is much more flexible. Front and back slides can be set for on-time or delayed motion relative to the turret movement—without *any* restriction to the sequence pattern. Both slides can be operated together or independently with any turret face and can be adjusted longitudinally, independent of each other.



TURRET FACE No. 1—Front Cross Slide operates *on time* relative to the turret motion.
TURRET FACE No. 3—Rear Cross Slide operates *on time* relative to the turret motion.
TURRET FACE No. 4—Front Cross Slide is *delayed* relative to the turret motion, for slide tool operation.
TURRET FACE No. 5—Front Cross Slide is *delayed* relative to the turret motion, for slide tool operation.

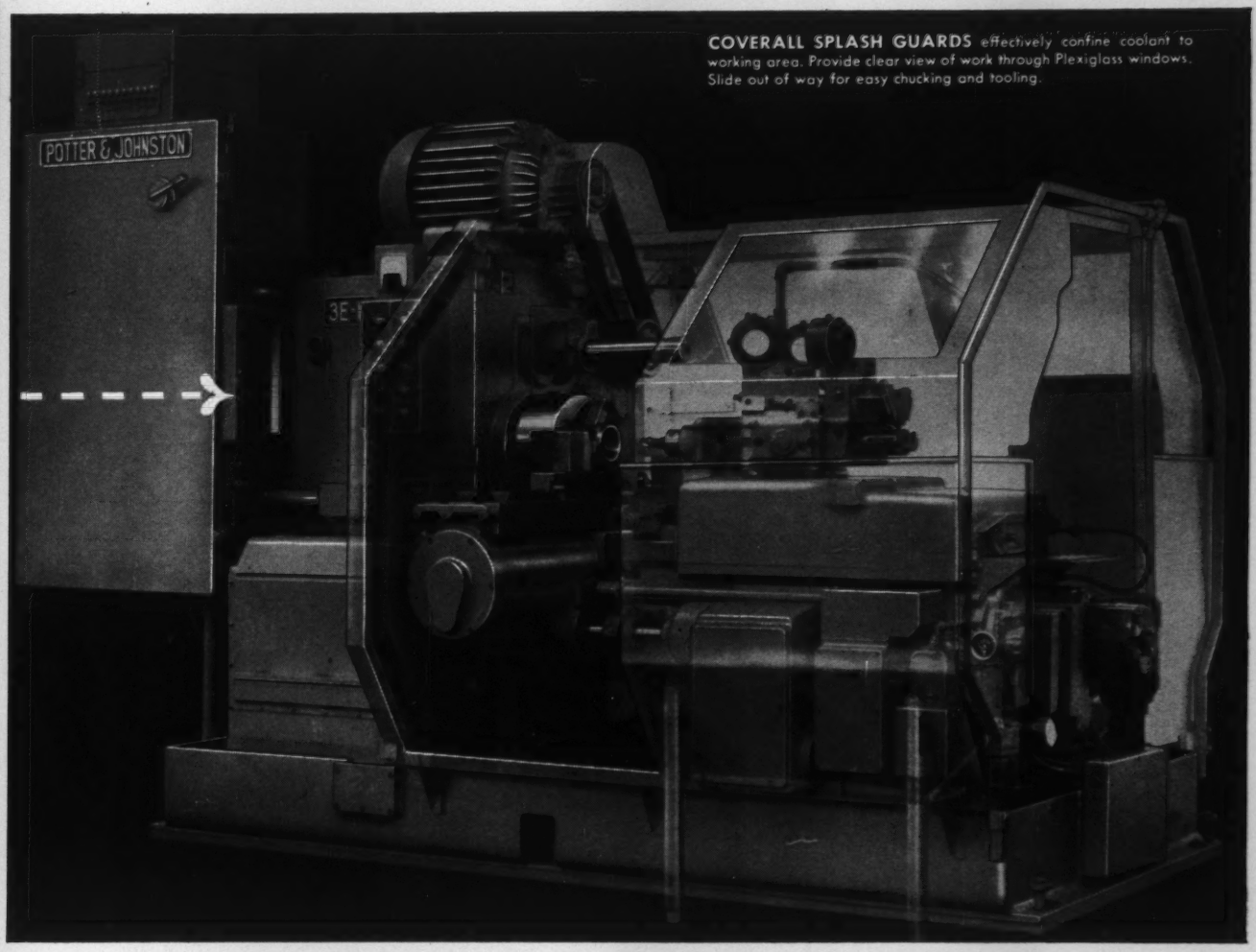
TURRET FACE No. 1—Front Cross Slide operates *on time* relative to the turret motion.
TURRET FACE No. 2—Rear Cross Slide operates *on time* relative to the turret motion.
TURRET FACE No. 3—Skip turret face.
TURRET FACE No. 4—Skip turret face
TURRET FACE No. 5—Front Cross Slide is *delayed* relative to the turret motion, for slide tool operation.

OPTIONAL TAPE CONTROL

Simple in design, easy to understand and operate, and priced far below other systems, P&J Tape Control can save up to 25% in machining and setup time. Tape controls all movements of the spindle, turret and cross slides, including all speed and feed changes. Tape preparation for the average job takes less than 30 minutes and requires no technical knowledge. Programming setup time is eliminated by placing the tape in the machine's tape reader—which only takes a couple of minutes. Optimum programming is assured, with parts machined in minimum time.

3E-15 Automatic

ADVANCED-DESIGN FEATURES YOU'RE LOOKING FOR!


COVERALL SPLASH GUARDS effectively confine coolant to working area. Provide clear view of work through Plexiglass windows. Slide out of way for easy chucking and tooling.
POTTER & JOHNSTON

The Potter & Johnston 3E-15 Automatic Turret Lathe is a truly new machine from the base up—*not* just an old model with a "face-lifting!" In addition to Selector Switch Cross Slide Control and Optional Tape Control, this machine also offers many other important new design and construction features, including: A new 15 hp headstock, with power to spare for fast metal removal with carbide tooling; greater rigidity throughout for faster roughing and more accurate finishing; "Control Zone" operation for faster, easier, more convenient setup and machining; separate drive for turret indexing for faster, easier setup; self-adjusting electric clutches that never require maintenance; a central, automatic lube system with single point fill; and a 6-face turret that allows more cuts per automatic machining cycle.

ON-THE-JOB PERFORMANCE . . . has already proved the ability of the P&J 3E-15 to cut machining time and costs. For a complete description of all the 3E-15 features, send now for your free copy of Circular No. 177 Pratt & Whitney Company, Inc., 10 Charter Oak Boulevard, West Hartford, Connecticut.

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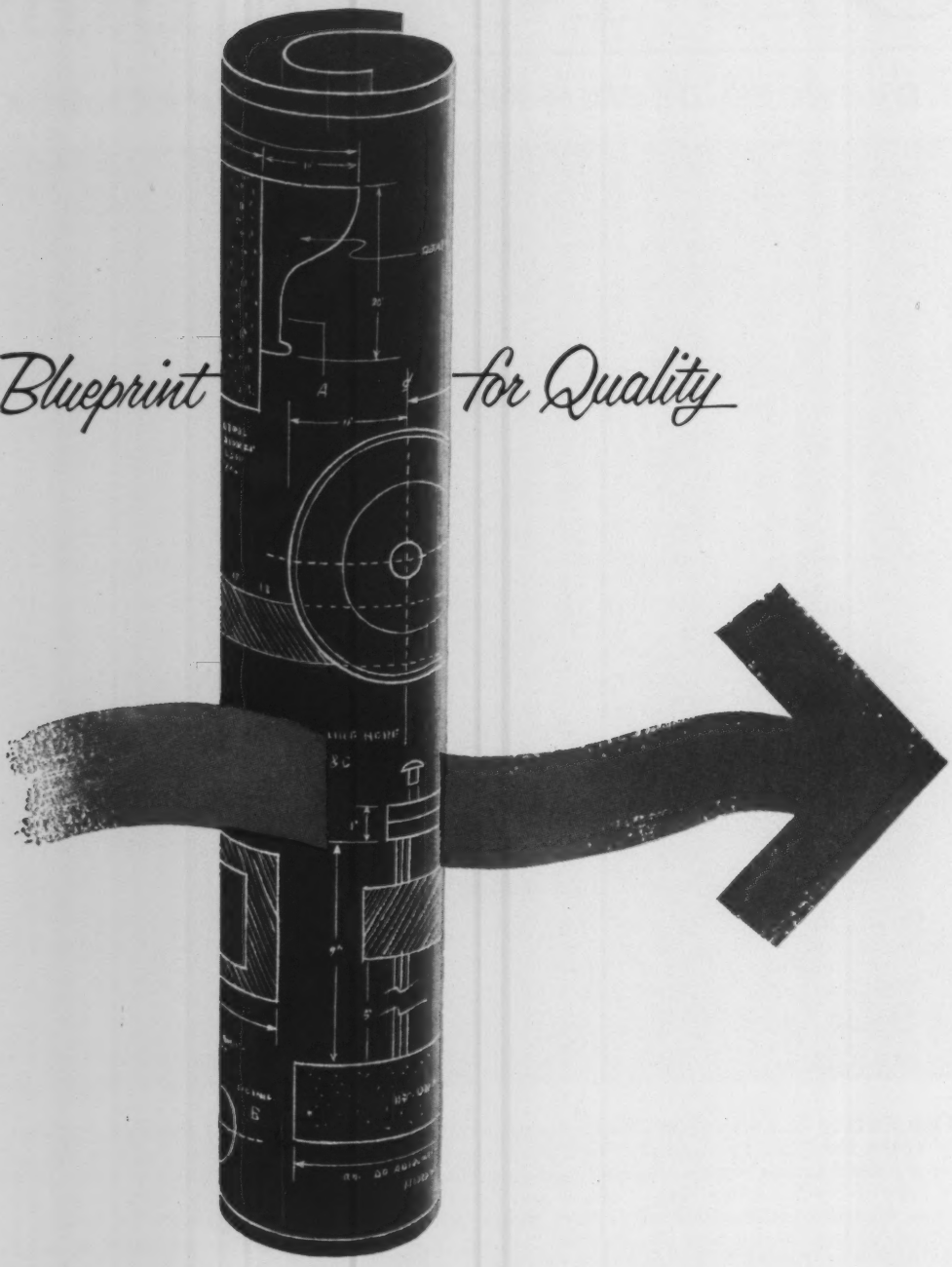
PRATT & WHITNEY®

FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

Your Blueprint *for Quality*



NOW SPERRY OFFERS ALL THREE Nondestructive Testing Techniques

Now, added to the Sperry Products line of ultrasonic test instruments and systems, are Triplett & Barton portable industrial X-ray and Peterson Sonoflux® magnetic particle test equipment. The combination of all three provides Sperry with the most versatile range of nondestructive testing devices and techniques available from one source.

SPERRY
Ultrasonic Testing

Sperry Products, the pioneer in ultrasonic testing, continues to stay ahead of the parade with newly developed systems and techniques — such as this SIMAC inspection system developed for Chrysler Corporation which automatically tests sheet steel for flaws at speed in excess of 400 feet per minute.

TRIPLETT & BARTON
Industrial X-ray

Triplett & Barton portable X-ray is unmatched for proven utility and heavy-duty performance — the real answer to your laboratory, production and field problems. Here the lightweight head (65 lbs.) of a 275 KV model is being positioned to inspect a weld in an airliner landing gear strut.

SONOFLUX
Magnetic Particle Systems

SONOFLUX brings to Sperry a complete new line of magnetic particle inspection equipment, both standard and special order, as well as services and a full line of supplies. Here a crankshaft is being checked for fatigue and stress cracks at the overhaul plant of an engine re-builder.

Sperry
ULTRASONIC TESTING

TRIPLETT BOSTON
INDUSTRIAL X-RAY

SONOFLUX
MAGNETIC PARTICLE

Call on your Sperry Sales Engineer. He is fully prepared to evaluate your quality control problem and recommend the most efficient nondestructive test system for you.

See Sperry's full line of nondestructive testing equipment at the Southwest Metal Show, Dallas.
At the Welding Show, Los Angeles

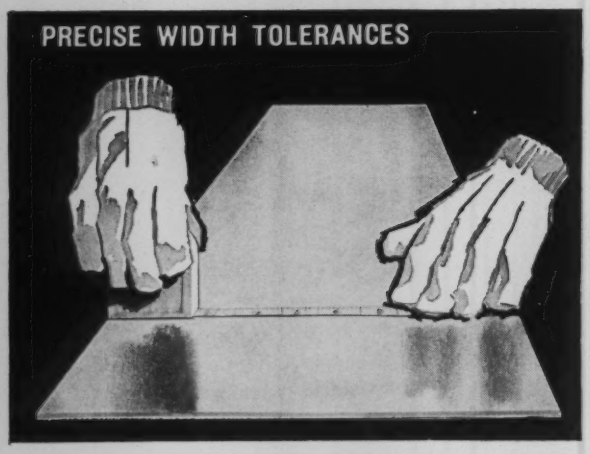
Sperry Products Company
DIVISION OF HOWE SOUND COMPANY
304 Shelter Rock Road, Danbury, Connecticut

Where precision is important...

use USS Amerstrip, the "quality-

USS Amerstrip is a specialty product, rolled in quantities that permits production on precision machines, tailored to the customer's product specifications. When you use USS Amerstrip you get seven important "quality controls" not obtainable with other manufacturing methods.

The finish you get on your Amerstrip order has been specially prepared to meet *your* product's needs.



If your fabricating machines require a special width strip that's just what you'll get with Amerstrip. USS Amerstrip can be produced in any width under 24 inches . . . well within exacting tolerance limits.

USS Amerstrip can be supplied in the thickness your machines demand. USS Amerstrip is fabricated on large production runs down to thickness tolerances as close as plus or minus .0005 inches.

American Steel & Wire representatives are experts in the fabrication and application of USS Amerstrip Cold Rolled Strip. Whenever you have a need or problem involving cold roll let these experts show you how USS Amerstrip can do it better. Get in touch with our nearest representative or write to American Steel & Wire, Dept. 0238, 614 Superior Ave., N.W., Cleveland 13, Ohio.

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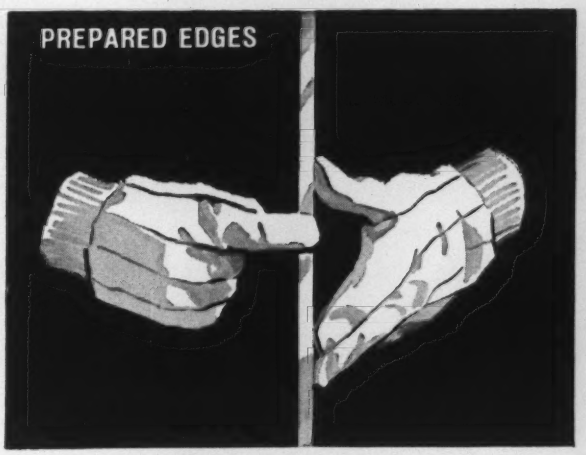
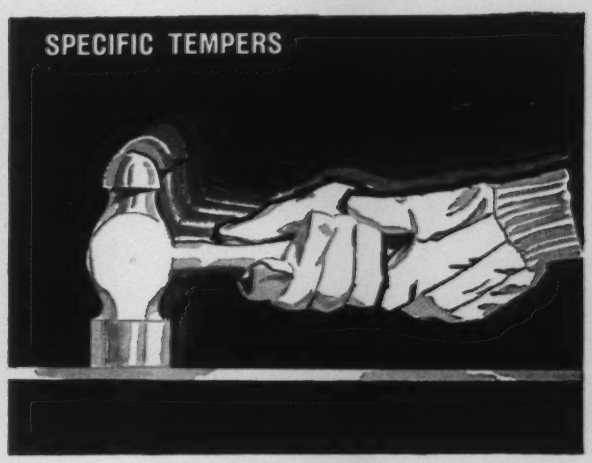
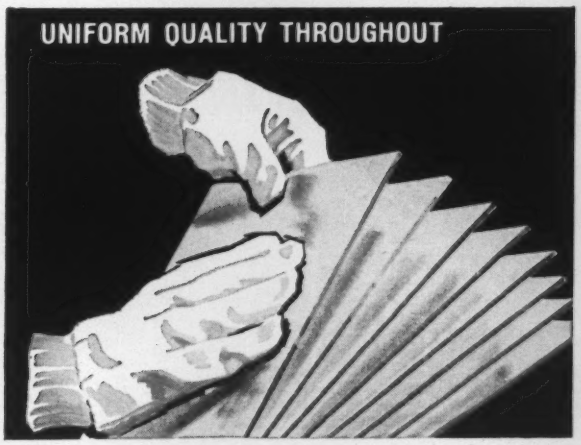
controlled" cold rolled strip steel



Because USS Amerstrip is produced in precision, order-size quantities, it can be supplied with the edge finish you need... square, standard, round, full round or bevel.



Whether your product must undergo a deep draw or other severe forming operation or require a special temper for rigidity, you'll get the exact temper you need when you order USS Amerstrip.



Whatever the size of your order . . . very large or very small, every coil of USS Amerstrip will be uniform in finish, in temper, in width and thickness. The use of USS Amerstrip will assure continuous production and high yields.

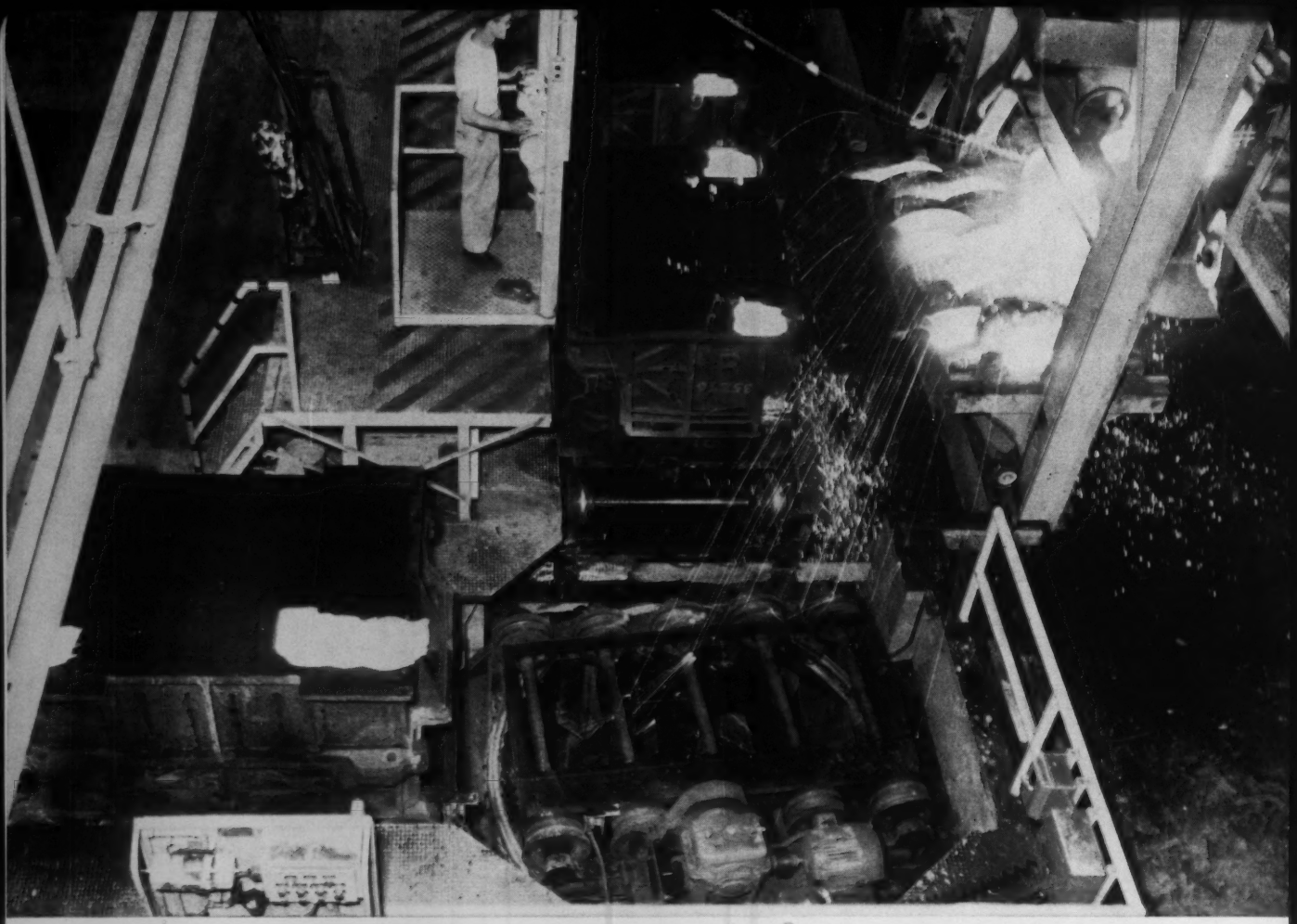
DESIGNED FOR END USE

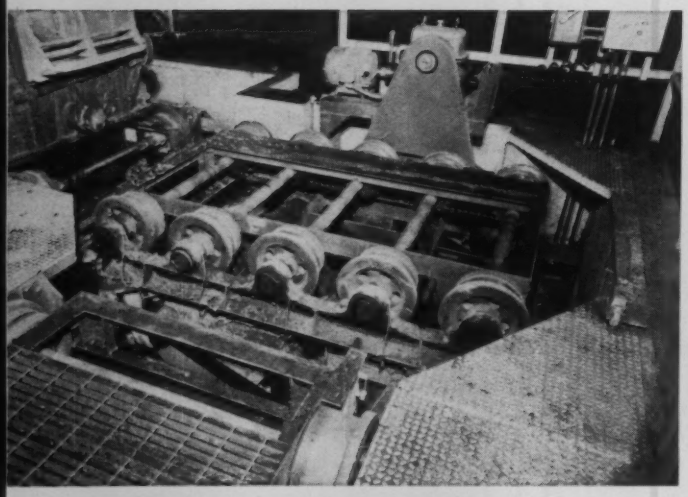
This is really the sum total of all these other advantages. Because USS Amerstrip is "Quality-Controlled," because it is engineered to meet your needs, it assures you smoother, faster operation; a better, more salable finished product.

American Steel & Wire Division of United States Steel

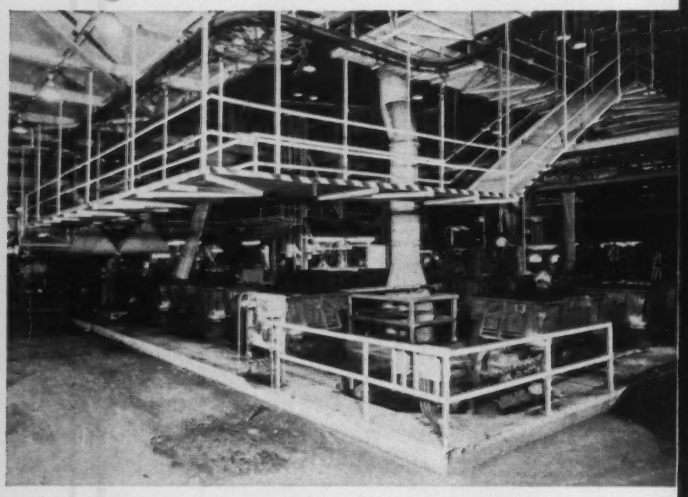
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, New York

Logan *Plant Dynamation* paces





Close-up view shows one of the specially designed wheel conveyors mounted on automatic air-driven turntable. System traveled by molds is made up of individually-powered conveyors about this length.



Second turntable occurs midway in cooling zone, dispatches molds toward automatic shake-out. Each conveyor indexes one mold in cascading order, eliminating gaps and synchronizing flow.

Logan conveyors move a nine-ton mold every minute at American Radiator & Standard Sanitary Corp.

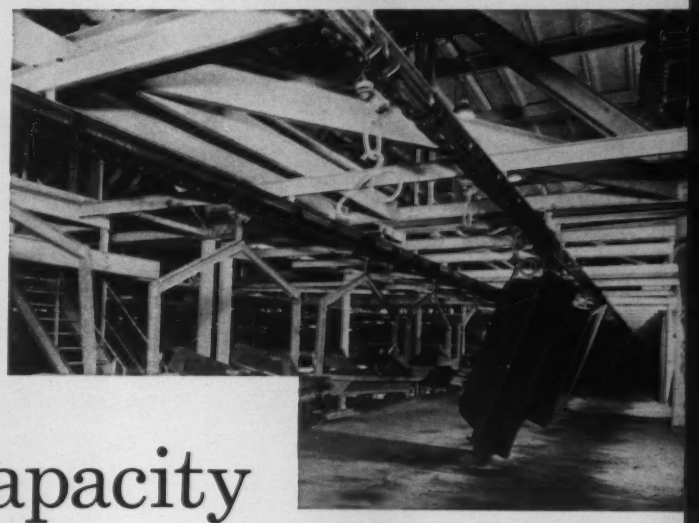
Modern casting equipment offered a high potential rate of output for this new major foundry in Louisville, Ky., but actual capacity would hinge to an important degree on conveyor design.

Large bathtub castings would need to be conveyed safely and rapidly through a U-shaped conveyor system while the metal was in the molten state. Each tub mold (metal, containing flask, and delicate sand mold) would weigh 18,000 lbs. To prevent crumbling, the conveyor ride would have to be exceedingly smooth. All steps on the casting floor had to be synchronized for fast continuous operation.

The Logan conveyor engineer collaborated with foundry equipment specialists to create a largely automatic casting floor system. The production pace achieved was one bathtub casting every minute!

Specially designed heavy-duty live flanged wheel conveyors give the necessary speed and smoothness. Molds glide through the two required turns on automatic air-powered turntables. Gaps between molds in the 256-ft. wheel system are eliminated by automatic indexing. The turntable shown at left has dispatched a mold to the cooling zone—now returns to pick up next mold from the pouring line. Ladles pour during turntable's indexed one-minute cycle.

The U-shaped automatic wheel series runs from the make-up zone to "shake-out," where hardened castings are removed. Two chain conveyors take automatically-removed flask parts quickly back to make-up for re-use.



(Right) After "shake-out," Logan overhead trolley conveyors carry castings through a bridge into blast-cleaning areas in next building.

new foundry to capacity

Logan conveyor design helps harness ALL the work-power potential of your plant

The productive power of today's machinery is tremendous, but a hundred fine machines still may not make a plant. Harnessing and activating all this potential work-power requires both skill and an adequate design concept. It can be a main key to success. Full *dynamation* of the plant comes only through the one right custom-designed conveyor system.

The Logan technique of Plant Dynamation ensures this one right system. The Logan engineer works with you through an exact analysis; then section by section he designs and specifies the conveyor dictated by the special dynamics of your plant.

Over the half-century in which production-line industry itself has grown up, Logan engineers have developed and extended the Plant Dynamation concept. On an average, "The Man From Logan" assigned to your area has participated in 14 years of this vital experience.

Only a complete-line conveyor company like Logan has the range of products to back up Plant Dynamation. To give your plant its one right system, the Logan engineer specifies freely from equipment in the five distinct modes of conveyor power and control: gravity, electricity, hydraulics, pneumatic devices and electronics.

Logan Dynamation Centers — complete master control centers—are well known in industry. The unusual ability to design complete controls as well as extensive automatic conveyor systems makes the Logan engineer especially valuable where the job requires close collaboration with other engineers.

"The Man From Logan" stationed near you is quickly available. This qualified specialist works with your engineers through design and installation to smooth operation. It is important to consult him early. Write or phone today for a conference on the *dynamation* of your plant.

Logan Conveyors

LOGAN CO., 545 CABEL ST., LOUISVILLE 6, KY.

DOW | SOLVENTS

NEU-TRI...

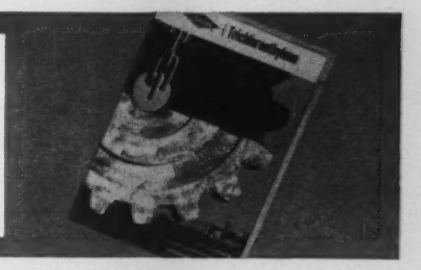
THE SUPER-STABLE NEUTRAL TRI gives you more mileage for your solvent dollar because it *stays* stable—even after prolonged periods of vapor degreasing. The powerful built-in stabilizer system in NEU-TRI® protects parts and equipment from corrosion, staining and pitting . . . increases cleaning efficiency.

Dow also offers ALK-TRI®, the alkaline-stabilized tri with powerful solvency and HI-TRI®, the trichloroethylene for cold cleaning missile components with excellent shock sensitivity properties that leaves little or no residue. Your distributor of Dow solvents will help you select the right one for your operation.

Chlorothene®, the safer solvent, can do a big job in every plant . . . for cold cleaning small metal parts, electric motors or for general maintenance. Ideal for spray, dip, wipe or bucket cleaning. Combines high safety, low toxicity.

NEU-TRI has high solvent power, low boiling point, high vapor density. This means fewer rejects, substantial savings in heat costs, less loss of solvent vapors due to "drag out."

ASK YOUR DISTRIBUTOR of Dow solvents for this booklet on trichloroethylene. It highlights the features of NEU-TRI as a fast, efficient vapor degreasing solvent. Get in touch with your distributor or write to your nearest Dow sales office.

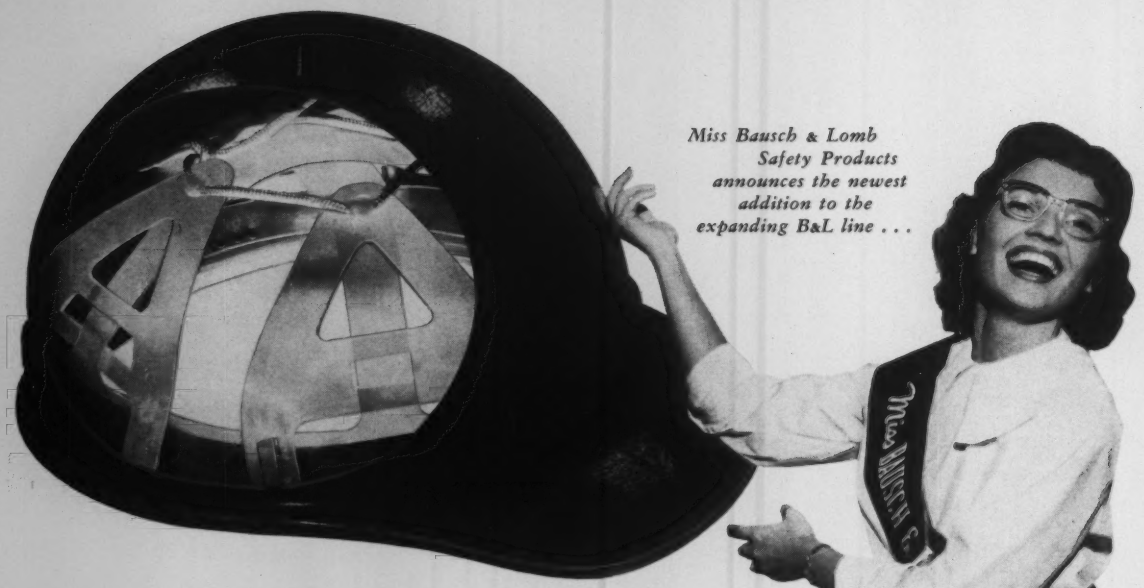


SEE YOUR DISTRIBUTOR OF DOW SOLVENTS FIRST!

The widest line of industrial solvents: Trichloroethylene • Perchloroethylene • Chlorothene • Methylene Chloride

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN DOW

See "The Dow Hour of Great Mysteries" on NBC-TV



Miss Bausch & Lomb Safety Products announces the newest addition to the expanding B&L line . . .

Look what's NEW in Safety Hats!

UNIQUE SUSPENSION DESIGN FOR MORE SECURITY, MORE COMFORT, CONVENIENCE AND HYGIENE

Bausch & Lomb, a world leader in industrial eye and ear protection, introduces a complete line of hard hats and caps. New suspension design increases protection, eliminates wobble, simplifies and speeds perfect head size adjustment. You replace zippered sweat bands without disturbing suspension. No buttons; no metal parts. See *all* the features of the biggest thing in hard hat value! Write or phone today for complete catalog material: Bausch & Lomb Optical Co., 98504 Lomb Park, Rochester 2, New York.

PROTECTION-**PLUS** Safety Products

protection + economy + worker acceptance

BAUSCH & LOMB

SINCE B&L 1853

ALLIS-CHALMERS

Rough-boring of fabricated steel low-pressure castings at Allis-Chalmers.

Test track for our own products

Experience in metal fabrication guides the design of products we offer you

Nobody understands the requirements of equipment for the metalworking industry better than people who are in it. As one of the world's largest metal fabricating companies, Allis-Chalmers sees first-hand how its own motors, control, pumps, and induction heaters perform under the severe everyday conditions of heavy usage, abrasive atmosphere and heat.

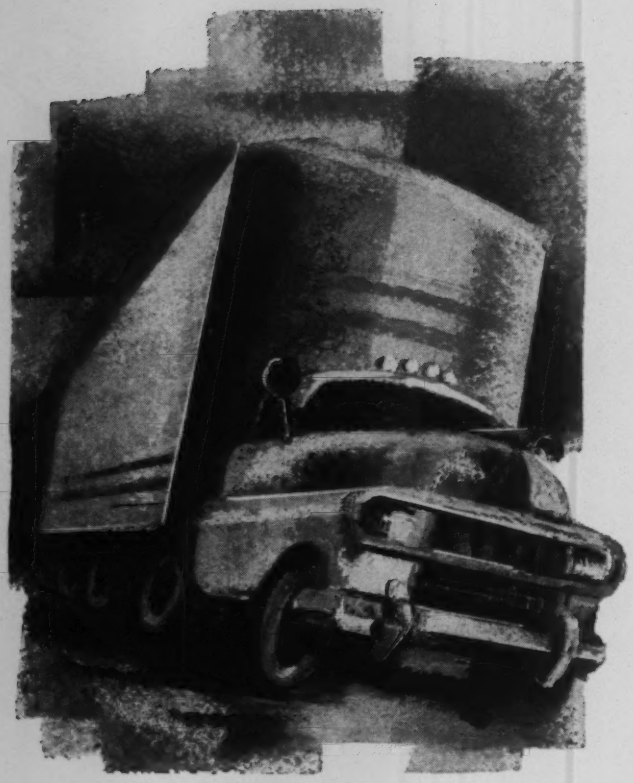
This experience with our own products lets us know their strong points . . . as well as the areas which might need greater improvement. It guides the design of our products in many ways . . . gives us operating results quickly . . . improves products with a realistic view of the actual conditions in the metalworking industry.

This system of proving Allis-Chalmers equipment and components in our own day-to-day "test track" is one of your greatest assurances of reliability, suitability, quality. *For further information call your nearby A-C distributor, representative, or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wis.*

• • •

A-C products for the metalworking industry: Centrifugal and Vacuum Pumps, Compressors, Motors, Control, Valves, Induction Heaters, Rectifiers, Transformers, Switchgear, Unit Substations, Water Conditioning Systems, plus Material Handling Equipment.

A-1320



New steels are born at Armco

from trucks to trikes . . .

Sheffield has the right bolts

Wherever wheels turn and people and cargoes travel, bolts are a necessary part of the picture. Remove all the bolts and civilization would fall apart.

Granted the importance of bolts, the next consideration is quality. You can be sure of this with Sheffield bolts. They're Sheffield-made and quality-controlled from furnace to finished product, in one of the world's largest bolt plants.

What's more, you can be sure of fast shipment of Sheffield bolts, in any type or size, in any quantity. Standard or special bolts, or bolt products custom-made to your specifications.

You name the need. Sheffield has the bolt. Get in touch with your Sheffield Man.

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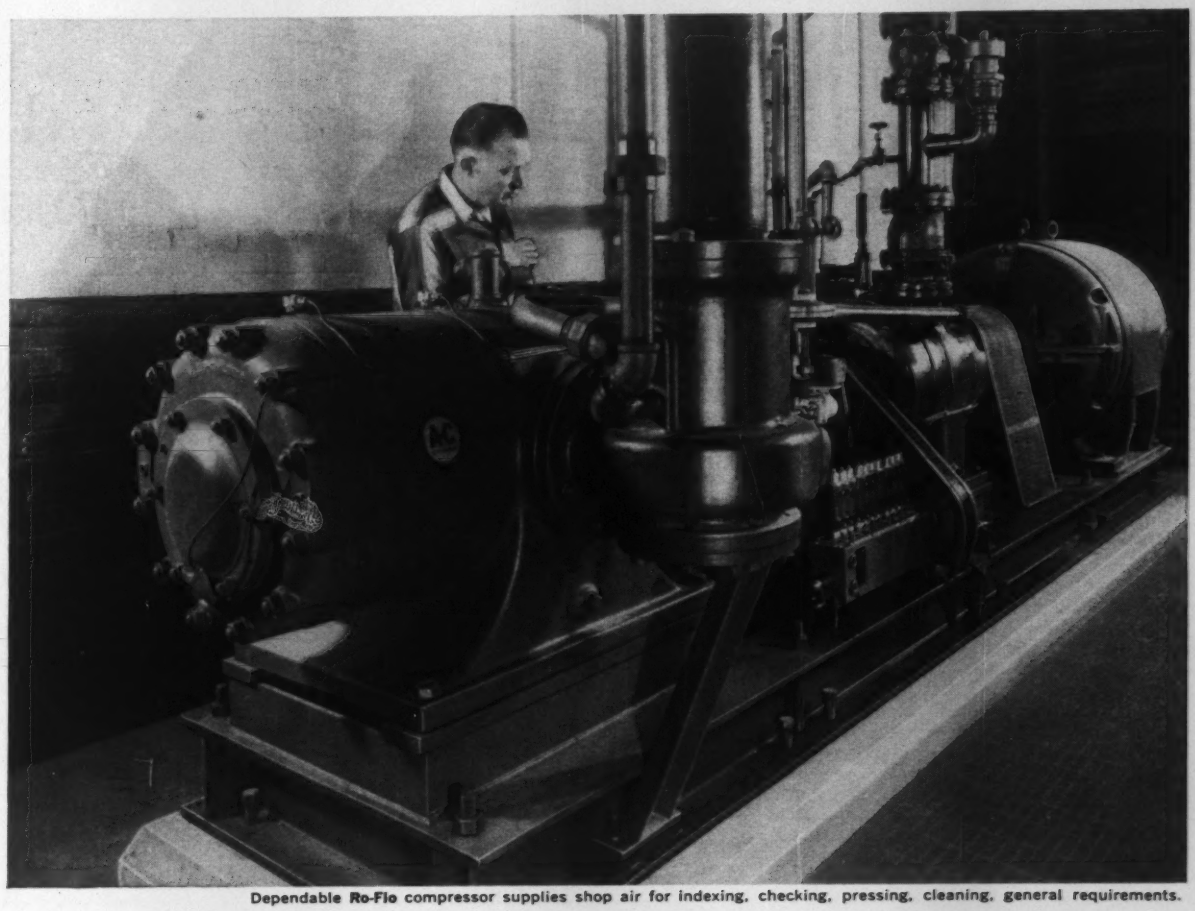


Dependable **Ro-Flo** compressor supplies shop air for indexing, checking, pressing, cleaning, general requirements.

Record-breaking run in Allegan

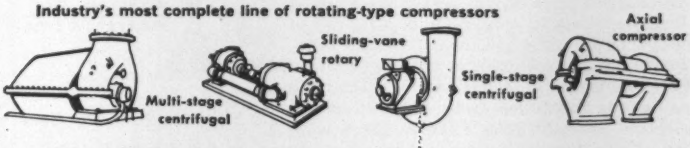
no new parts for this RO-FLO compressor since installation

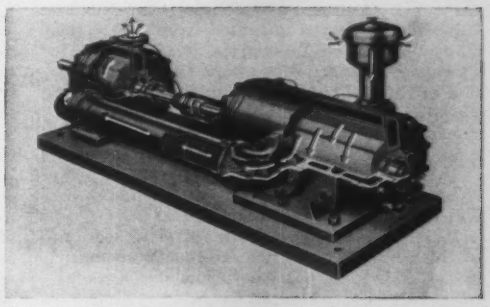
With 17 years of trouble-free experience using A-C rotary compressors, Rockwell-Standard Corporation installed this two-stage *Ro-Flo* sliding-vane compressor at their Universal Joint Division, Allegan, Michigan, in January, 1957.

It hasn't let them down. It's been operating 24 hours a day, six to seven days a week, with no major stoppages and no new parts installed since the initial start-up three years ago.

Ask your A-C representative about low-noise, low-maintenance *Ro-Flo* compressors. Or write **Allis-Chalmers,** Industrial Equipment Division, Milwaukee 1, Wisconsin.

Industry's most complete line of rotating-type compressors





Sliding-vane action compensates for blade wear, helps maintain constant efficiency. Rotary motion cuts vibration and noise, eliminates shock and the necessity for expensive foundations. *Ro-Flo* is an Allis-Chalmers trademark. A-1306

NO. 3 OF A SERIES

"How to Design Welded Aluminum Structures"

Additional Strength Revealed in Welded Aluminum Members Under Tension

Mr. Harry N. Hill, Engineering Design Division Chief, Alcoa Research Laboratories, Aluminum Company of America, reports research findings presented at the 1959 annual meeting of the American Society of Civil Engineers.

What *is* the strength of a welded aluminum alloy tension member? Extensive research shows that there is no single answer for any given alloy. Such strength depends on the location and extent of the welds . . . and whether the most important factor is *ultimate strength* or *resistance to permanent deformation*.

In many practical cases, welded tension members are very nearly as strong as the parent metal that is not welded, despite the softening effect of the heat of welding. This article provides design concepts for determining the strength of welded tension members by applying the rules from the first two articles in this series.

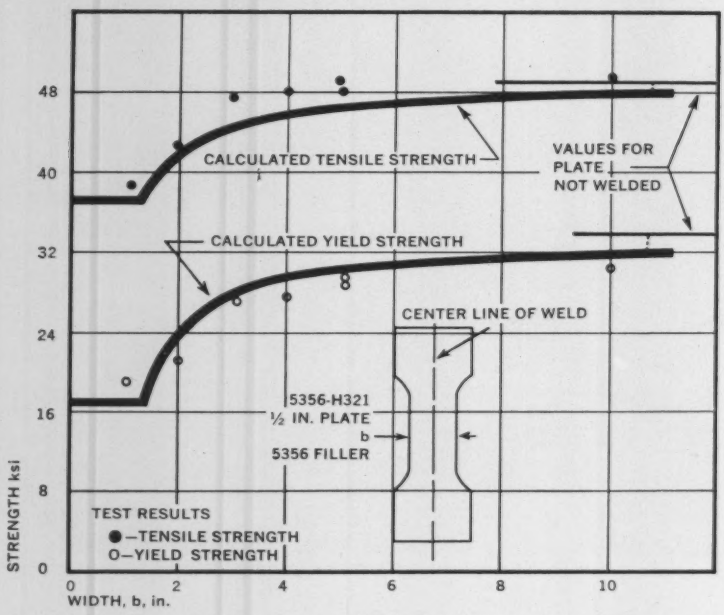
First, let us consider a tension member that is stressed in a direction parallel to a weld. The chart at right was developed from tensile tests made at Alcoa Research Laboratories on plate specimens of a cold-worked aluminum alloy having longitudinal butt welds. The curves on the chart represent calculated strengths based on the "reduced-strength zone" concept. The formula below the chart was developed from this design concept. Yield strength is similarly computed.

Strengths calculated from these formulas are shown to agree very well with the tensile and yield strengths obtained from the tests. Hardness tests of the test specimens revealed a reduced-strength zone about ½ in. on either side of the weld. Although in this region the strength is appreciably reduced, tests with specimens 6 or 8 in. wide show over-all strength just a few per cent below the strength of the unwelded material!

Let us now consider tension members in which the stress is across the weld.

Where the weld covers the full cross section of the member, the ultimate tensile strength is determined by the condition of the metal immediately adjacent to the weld.

However, if the determining factor is *permanent deformation* rather than ultimate strength, use of the "10-in. gage length yield strength" concept will generally indicate strength 30 to 40 per cent higher than the minimum yield strength of the material immediately adjacent to the weld. When a transverse weld does not cover the full cross section of a member, the reduced-strength zone concept can be applied as for longitudinal welds, as above.



Results of Tension Tests of Longitudinally Welded Members

$$f_u = f_{uo} - \frac{A_r}{A}(f_{uo} - f_{uh})$$

where: f_u = tensile strength of welded member, psi
f_{uo} = tensile strength of parent metal not welded, psi
f_{uh} = minimum tensile strength in the reduced-strength zone, psi
A = cross-sectional area of the member, in square inches
A_r = area of the cross section within the reduced-strength zone, in square inches

This is the third in a series of design concepts that are providing engineers with a more realistic set of rules for applying welded aluminum to structural work. Watch for additional subjects in this series: strength of welded members in compression, strength of welded beams, fillet welds and design data.

For top-quality aluminum welding products such as consumable electrodes, welding and brazing rods and fluxes, and solder and soldering fluxes, contact your nearest Alcoa sales office. For more complete information on "Designing Welded Aluminum Structures," write Aluminum Company of America, 1761-C Alcoa Building, Pittsburgh 19, Pa.

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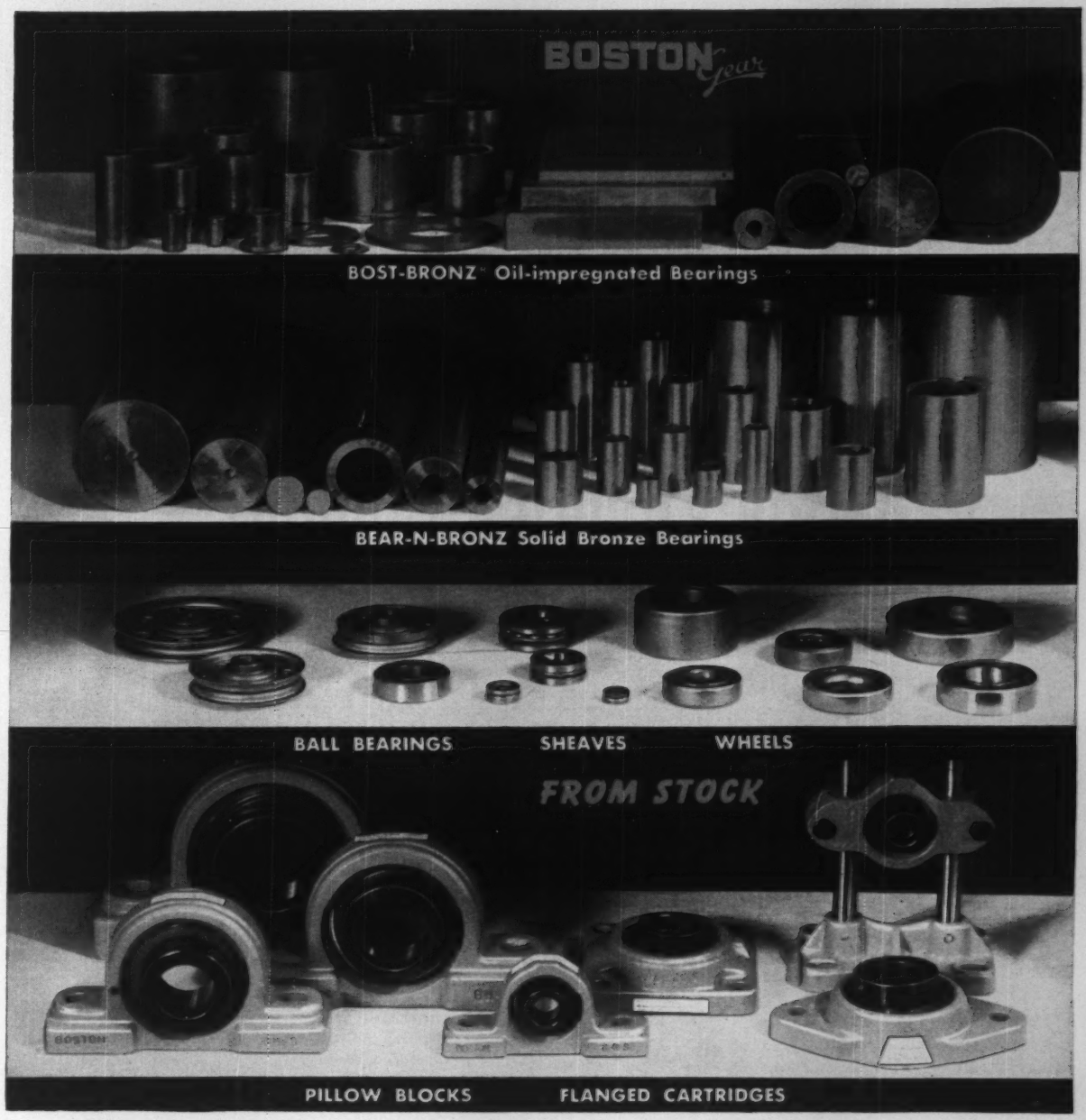

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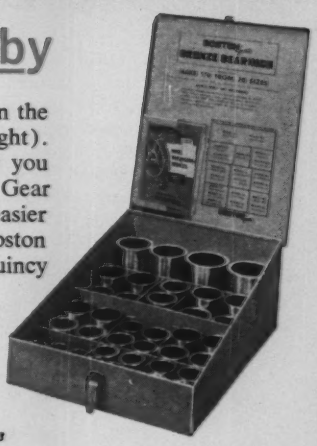

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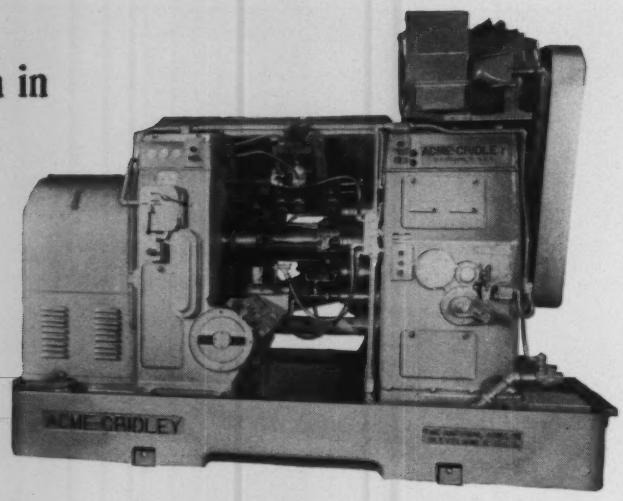

Acme-Gridley multiple-spindle shaft machine equals output of four automated lathes

At Chrysler Corporation's Trenton, Michigan, Engine Plant, a remarkable new National Acme shaft turning machine has slashed camshaft production costs; is hailed as a major production development for the entire industry. Performing complete shaft journal machining in a single set-up, this rugged 6-spindle automatic provides substantial savings in floor space and capital outlay, reduces scrap loss and enables closer control of machining operations.

Key to this dramatic pay-off are imaginative National Acme solutions to the difficult problems of centering, driving, and stabilizing the long, flexible shaft during turning operations. An ingenious part-holding technique exposes bearing journals for turning—an impossibility in a chucking set-up.

Extreme capability is stressed in the design of the Universal Multiple-Spindle Shaft Turning Machine and permits the maximum number of machining operations to be performed on straight or flanged shafts held between centers.

The shaft turning machine is additional evidence of National Acme know-how applied to the solution of special machining problems. This same insight and ability is available to any manufacturer interested in reduced costs and increased production. Our representative is as close as your telephone.

National Acme's "Zone of Responsibility" includes all phases of cost reduction. Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Chrysler Corporation . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

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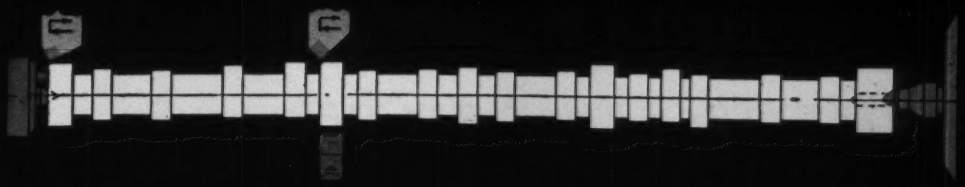
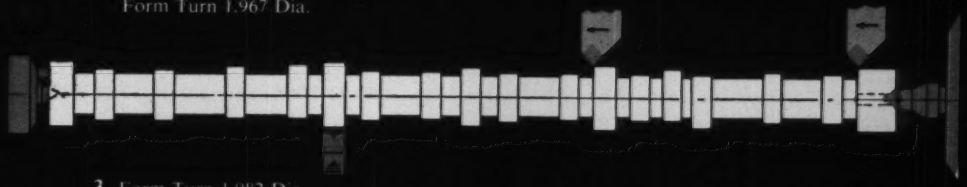
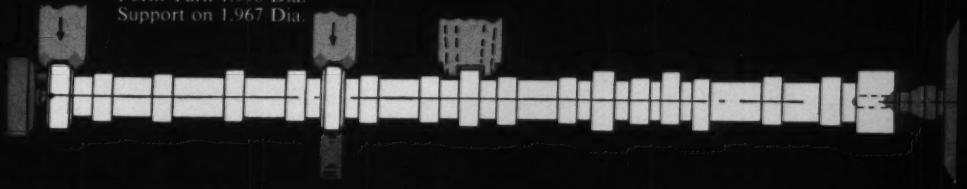


2. Form Turn 1.951 Dia.
Form Turn 1.967 Dia.



3. Form Turn 1.982 Dia.
Form Turn 1.998 Dia.
Support on 1.967 Dia.

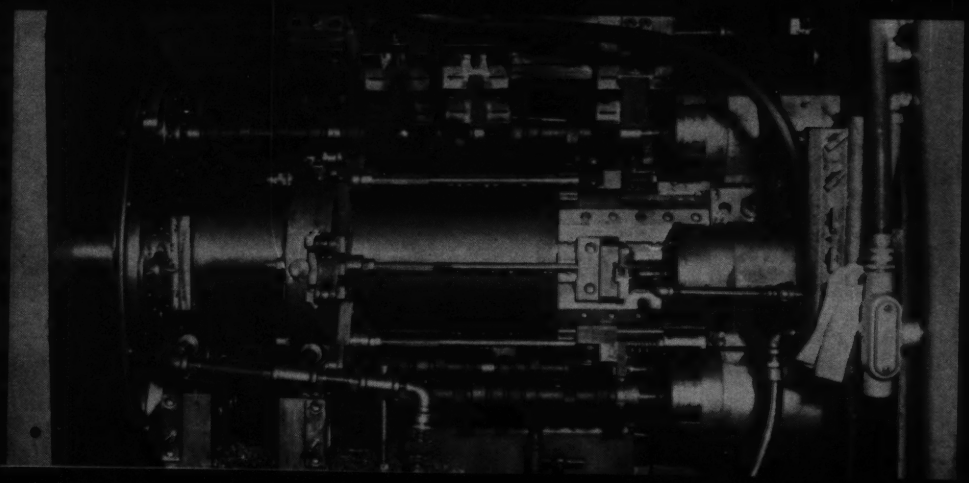


4. Chamfer O.D. of 1.951 Dia.
Chamfer O.D. of 1.967 Dia.
Face Sides of 1.743 Dia.
Support on 1.967 Dia.

5. Face End of Camshaft
Relieve Turn 1.743 Gear Dia.
Support on 1.967 Dia.

6. Chamfer O.D. of 1.743 Dia.
Chamfer O.D. of 1.982 Dia.
Chamfer O.D. of 1.998 Dia.
Support on 1.967 Dia.

High-test cast iron camshaft with journal machining completed . . . 13 operations in 22 seconds.



Close-up of tooling zone. Open spindle in load and unload position shows unique centering, holding and driving mechanism.

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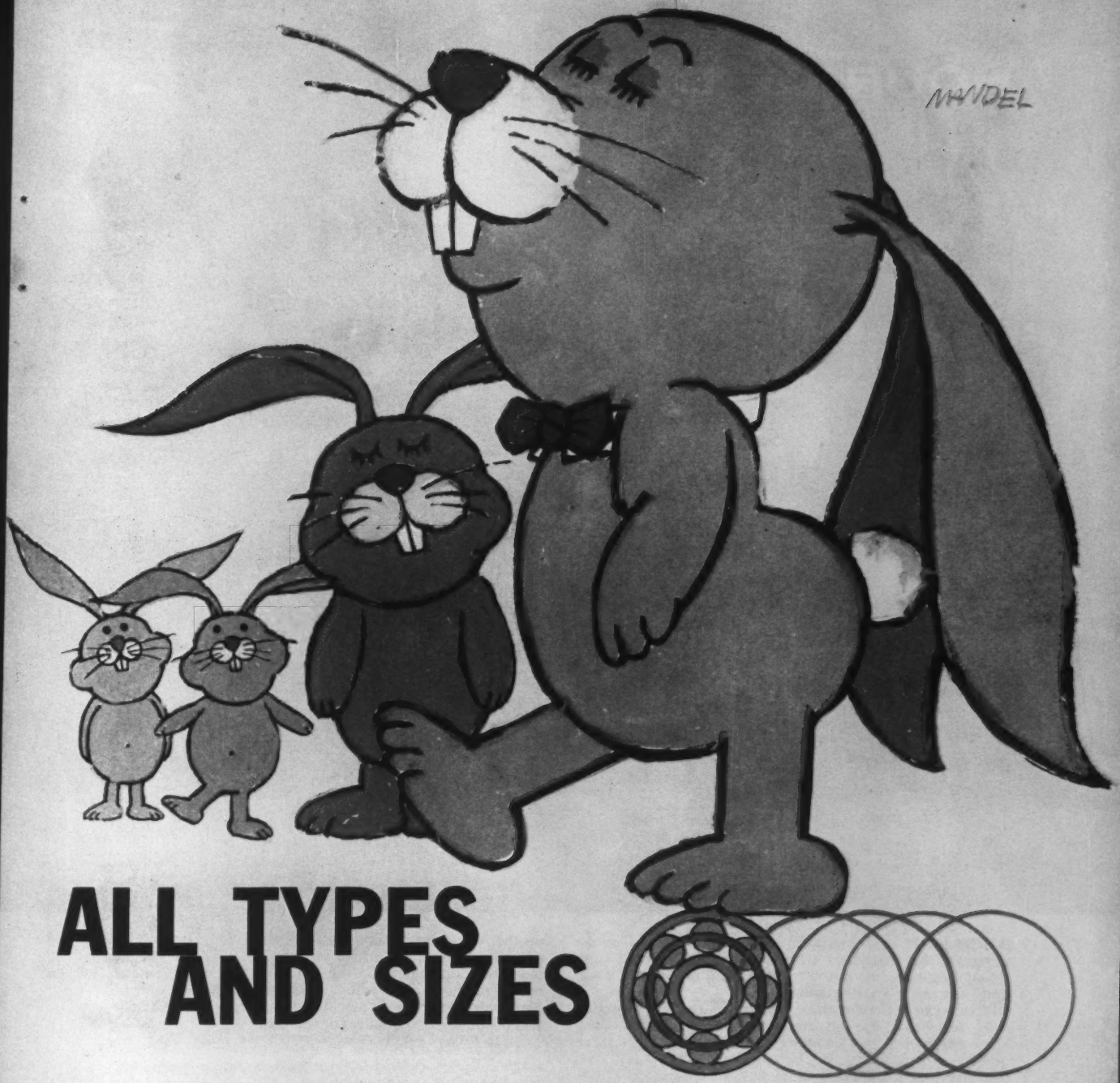

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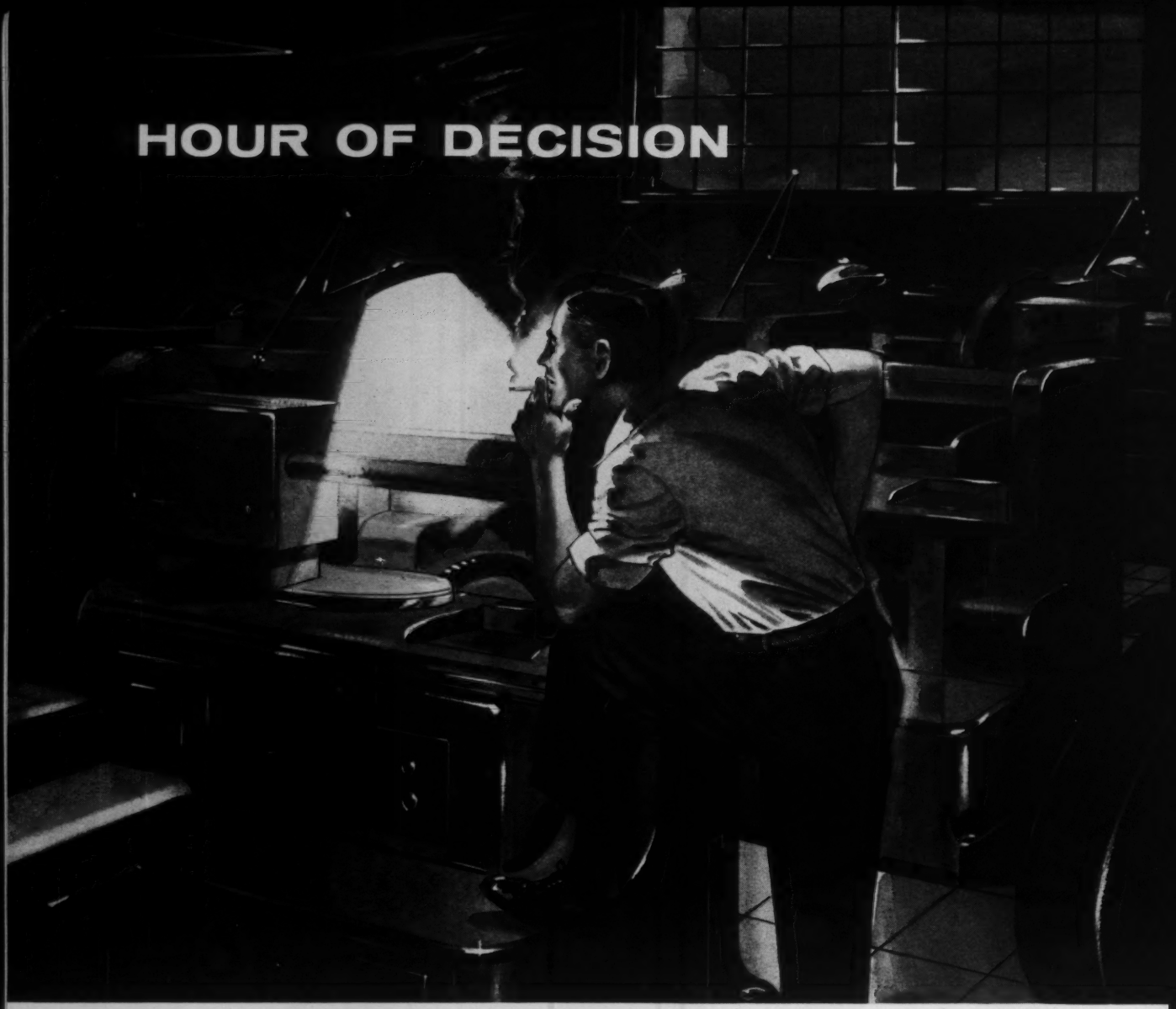

IS THIS YOU? How many times, after the call bell stops clanging, the customers stop phoning, and people stop asking questions, do you walk into the quiet shop to face up to the really vital decisions?

"How can we compensate for the rising costs of materials, overhead, payroll, maintenance?" "How can we keep producing the exacting tolerances, finishes, and quality our markets are demanding?" "How can we improve our production efficiency so that our narrow profit margin will not disappear altogether?" "How can we meet and beat the increasing world-wide competition in our field?"

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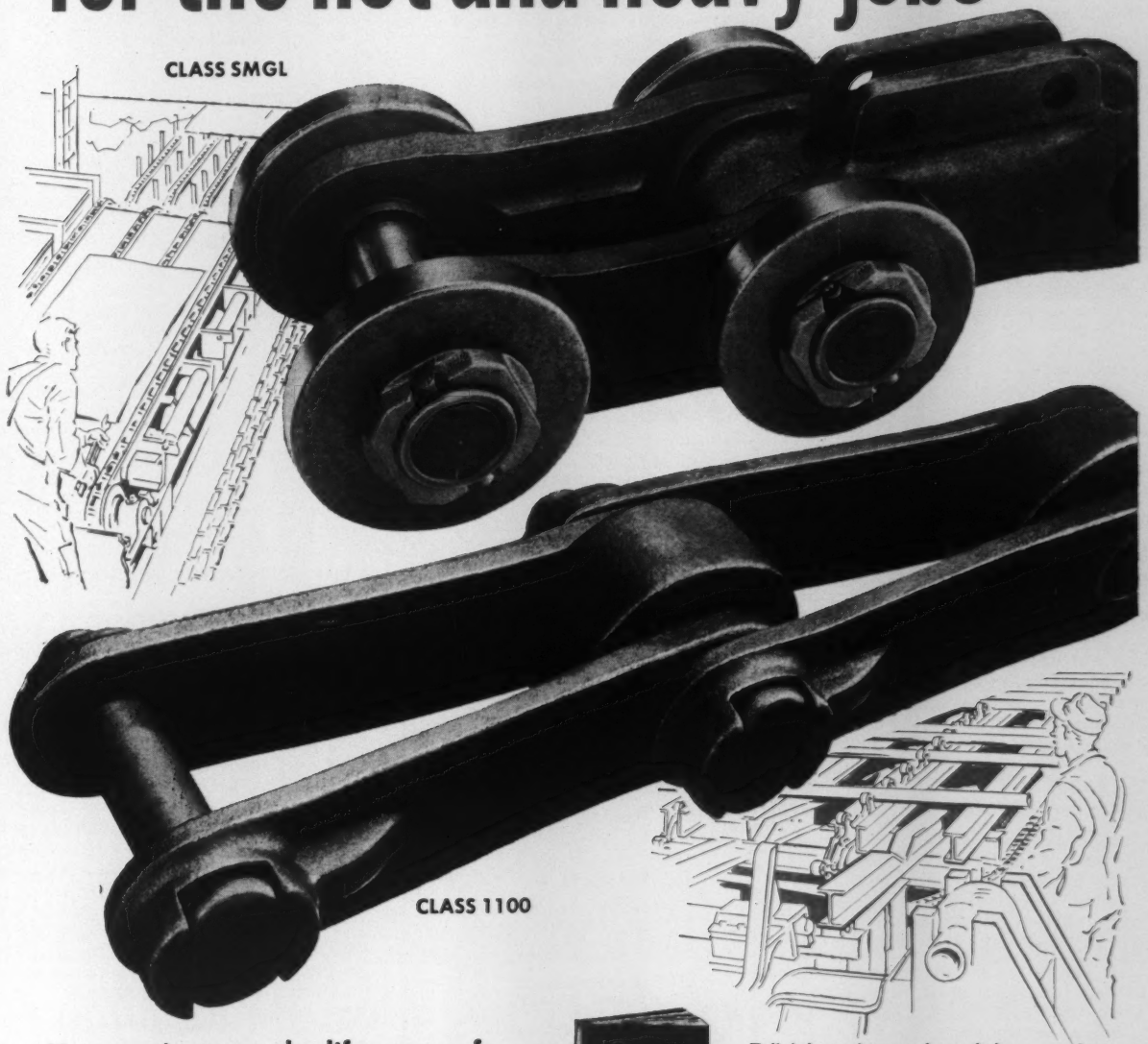

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CLASS SMGL combination chains are designed specifically for furnace conveyor service. Sidebars and center links are made of "file-hard" Promal, with bosses on sidebars to reduce stress on free-floating pins. CLASS 1100 roller chain is ideal for horizontal or inclined rolling elevators and conveyors.

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(Advertisement)

Why metals corrode... and how you can prevent it

The basic cause of corrosion is the instability of metals in their refined state. Metals tend to revert to their natural states through the processes of corrosion. For example, when you analyze rust, you will find it is iron oxide. When you analyze natural iron ore, you find it, too, is iron oxide. Six forms of corrosion which can attack the equipment you design are:

1. General tarnishing or rusting with occasional perforations in highly affected areas.

2. Highly localized attack by pitting.

3. Cracking induced by a combination of stress and corrosion.

4. Corrosion confined to crevices, under gaskets, or washers, or in sockets.

5. Corrosion of one of an alloy's constituents leaving a weak residue.

6. Corrosion near the junction of two different metals.

In all of the six forms of corrosion mentioned above, corrosion has the same basic mechanism. It's similar to the electrochemical action in a dry cell.

The electrolyte in the dry cell corresponds to the corrosive media, which may be anything from the moisture in the air to the strongest alkali or acid.

The plates of the battery correspond to the metal involved in corrosion.

A potential difference between these metals or different areas on the same metal causes electricity to flow between them through the electrolyte and a metallic bridge or contact that completes the circuit.

At the anode, a destructive alteration or eating away of metal occurs when the positively charged atoms of metal detach from the solid surface and enter the solution as ions.

The corresponding negative charges, in the form of electrons, travel through the metal, through the metallic bridge, to the cathode.

Briefly then, for corrosion to occur, there must first be a difference in potential between the metals or areas on the same piece of metal so that electricity will flow between them. Next, a release of electrons at the anode and a formation of metal ions through disintegration of metal at the anode. At the cathode, there must be a simultaneous acceptance of electrons. Action at the anode cannot go on alone, nor can action at the cathode.

CONTROLLING CORROSION

When corrosion occurs because of the differences in electrical potential of dissimilar metals, it is known as galvanic action. Differences in potential from point to point on a single metal surface causes corrosion known as local action.

When you plan against galvanic corrosion it is essential to know which metal in the couple will suffer accelerated corrosion . . . will act as the anode in the corrosion reaction.

The galvanic series table shown below can supply this information. In any couple, the metal near the top of this series will be the anode and suffer accelerated corrosion in a galvanic couple. The one nearer the bottom will be the cathode and remain free from attack or may corrode at a much slower rate.

GALVANIC SERIES TABLE

Magnesium
Magnesium alloys
•
Zinc
•
Aluminum 25
•
Cadmium
•
Aluminum 17ST
•
Steel or Iron, Cast Iron
•
Chromium-iron (active)
•
Ni-Resist
•
18-8 Stainless (active)
18-8-3 Stainless (active)
•
Lead-tin solders
Lead, Tin
•
Nickel (active)
Inconel (active)
•
Brasses, Copper, Bronzes
Copper-nickel alloys, Monel
•
Silver solder
•
Nickel (passive)
Inconel (passive)
•
Chromium-iron (passive)
18-8 Stainless (passive)
18-8-3 Stainless (passive)
•
Silver
•
Graphite, Gold, Platinum

HOW TO USE THE CHART

Notice how the metals are grouped in the galvanic series table. Any metal in one group can be safely used with any other metal in the same group. However, when you start mixing metals from different groups, you may run into serious galvanic corrosion of the metal higher on the list. And the further apart these metals are listed, the worse this corrosion may be.

But, if you have to mix metals, pay particular attention to the electrical contact between them. Eliminate any metallic bridges or contacts of metal to metal that will permit the flow of electrons through them. You can do this by separating the metals physically, or by using insulation or protective coatings. Another factor is the relative areas of the metals in contact with each other. Parts having the smaller area should be of a metal with a lower listing on the galvanic series table than the metal used for the larger area.

When you plan against local action, remember that the corrosion process is galvanic: Electrons move from one point in the metal to another. One of the easiest ways to prevent local action is to use a metal with little or no impurity. When alloys are involved, make sure the constituents are closely listed in the galvanic series table. Local action may also be stopped by the use of protective coatings, which shield the metal from the corrosive media. Environment must also be considered, for its nature may be an important factor in either promoting or restricting corrosion.

TECHNICAL ASSISTANCE

As you can see, many factors are involved in both local and galvanic action. That's why it's best to bring your metal problem to Inco's Corrosion Engineering Service. Available data will be furnished wherever possible . . . tests will be made where needed. Inco's Corrosion Engineering Service will be glad to apply principles of corrosion control to your specific problem.

LITERATURE

The publications listed below will provide more detailed information on how you can combat corrosion by using nickel-containing metals.

Publication Number	Name
A232	Corrosion Problems in Nuclear Reactor Power Stations
A59	Factors of Importance in the Atmospheric Corrosion Testing of Low-Alloy Steels
A62	A Theory of the Mechanism of Rusting of Low-Alloy Steel in the Atmosphere
A137	Corrosion by Some Organic Acids and Related Compounds
A144	Some Observations of the Potentials of Stainless Steels in Flowing Sea Water

A complete list of the 187 Inco publications and technical bulletins on nickel-containing metals can be obtained by writing for "List A", to:

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67 Wall Street INCO New York 5, N.Y.

A missile component is being tested here at minus 300°F in an atmosphere of Airco nitrogen. An environment has been created — by an Airco gas — that is as rugged as ultimately the missile itself will find.

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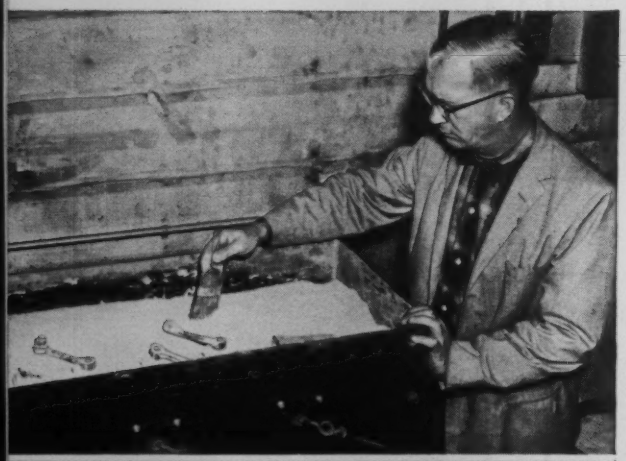
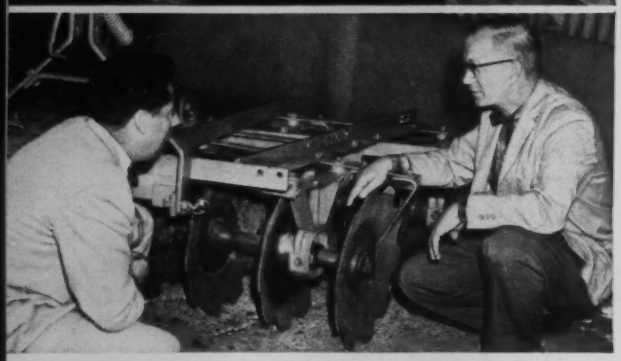
Allis-Chalmers uses **RYKON** *Grease in bearing shield—offers farmers better disc harrow*

can **RYKON** Grease help you improve your product?





Above: Maynard Walberg sweeps sand back over disc harrow bearings on test stand. RYKON Grease is undergoing 2,000-hour test in this simulation of actual farm service conditions.

Below: Allis-Chalmers disc harrow ready for shipment from the plant gets inspection from Standard's Fred Parkinson and Walberg.

Maynard Walberg, Allis-Chalmers project engineer, and Standard Oil lubrication specialist Fred Parkinson, examine disc harrow bearing assembly. Fred is well equipped through training and experience to help industrial customers with lubrication problems. He has been doing this work for 11 years at Standard. He has a degree in chemistry and engineering from Brown University. Plus that, he has completed the Standard Oil Sales Engineering School.

Situation: Bearings of a disc harrow in service are always turning in dusty conditions, oftentimes completely covered with soil. Such bearings in the Allis-Chalmers harrow are protected with grease-coated rubber shields. The grease guards against dirt getting past the shield and into the bearing.

What was done: Allis-Chalmers project engineer in the LaCrosse, Wisconsin plant, Maynard Walberg, called Fred Parkinson, Standard Oil lubrication specialist, for a sample of RYKON Grease. In conditions simulating field service, RYKON Grease was tested. Bearings were rotated in the most abrasive dirt available—Mississippi sand with a high quartz fraction.

What happened: Tests were started and run to destruction. Prior to the use of RYKON Grease, bearing failures occurred at 500 hours. On switching to RYKON Grease, these tests were pushed to 2,000 hours. At this point, tests were stopped. Bearings were still in operating condition.

What you can do: Find out how RYKON Grease might help you offer your customers a better product. Inquire of the Standard Oil lubrication specialist nearest you anywhere in the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 So. Michigan Ave., Chicago 80, Ill.**

STANDARD

You expect more from STANDARD and you get it!

Quick facts about RYKON

- Heat stable. At sustained high temperatures RYKON Grease remains soft and grease-like.
- Resistant to water-washing.
- Mechanically stable. Minimum change in consistency in service.
- Resistant to oxidation. Thickener acts as an inhibitor.
- Exceptional rust-preventive properties.

Somewhere North of Baffin Bay

The Arctic is almost as silent and lifeless as an ice-cube. But, deep inside it, these 400-foot long missile-detection antennas will guard the life of our country.

Steel

They're part of a Ballistic Missile Early Warning System (BMEWS). Officially, you'd call them surveillance radar antennas. Yet, they look like over-sized baseball mitts. That web-like framework can detect (or spot) a far-off missile darting through the shivering Arctic sky, and rifle its speed and direction to any of our military bases in seconds.

Up here, weather is a constant battle. Arctic storms slam into the 163-foot high antennas, and rake icy fingers back and forth over the mesh-faced structures. But they'll stand for years. The D. S. Kennedy Com-

pany, builders, made certain of that by weaving foot after foot of USS National Seamless Carbon and Nickel Alloy Tubing into every antenna.

For over 90 years, USS National Pipe and Tubes have been used for demanding tubular installations in the fields of line pipe, pressure tubing, mechanical tubing, structural pipe and oil country tubular products. Would you like to benefit from our experience? Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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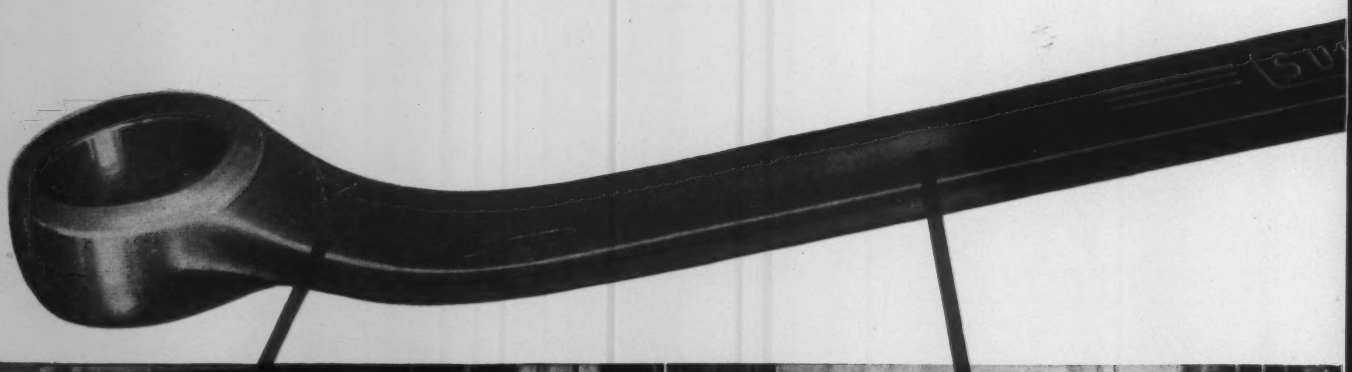
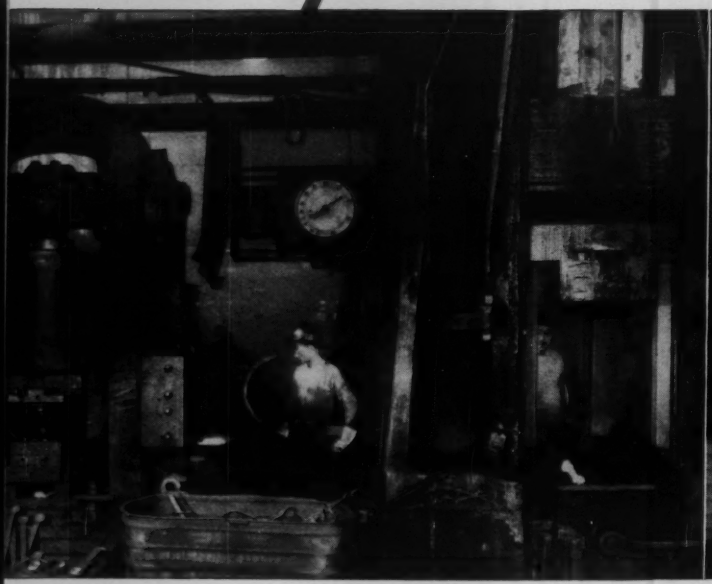
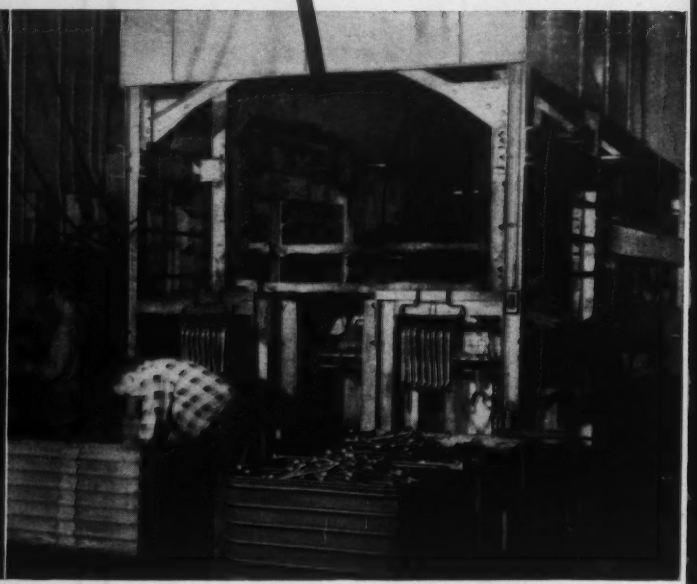
It's a Push-Button World at Williams

No other manufacturer has the combination of automated equipment to make the finest fit, feel and finish in wrenches!





Forging temperatures for each of Williams' 65 hammers are automatically controlled by sensitive pyrometric instruments which comply with rigid aircraft specifications, MIL-Q-5923C (USAF). The result is tough, fine-grain forgings every time. Die matching is held to close tolerances for maximum structural uniformity.

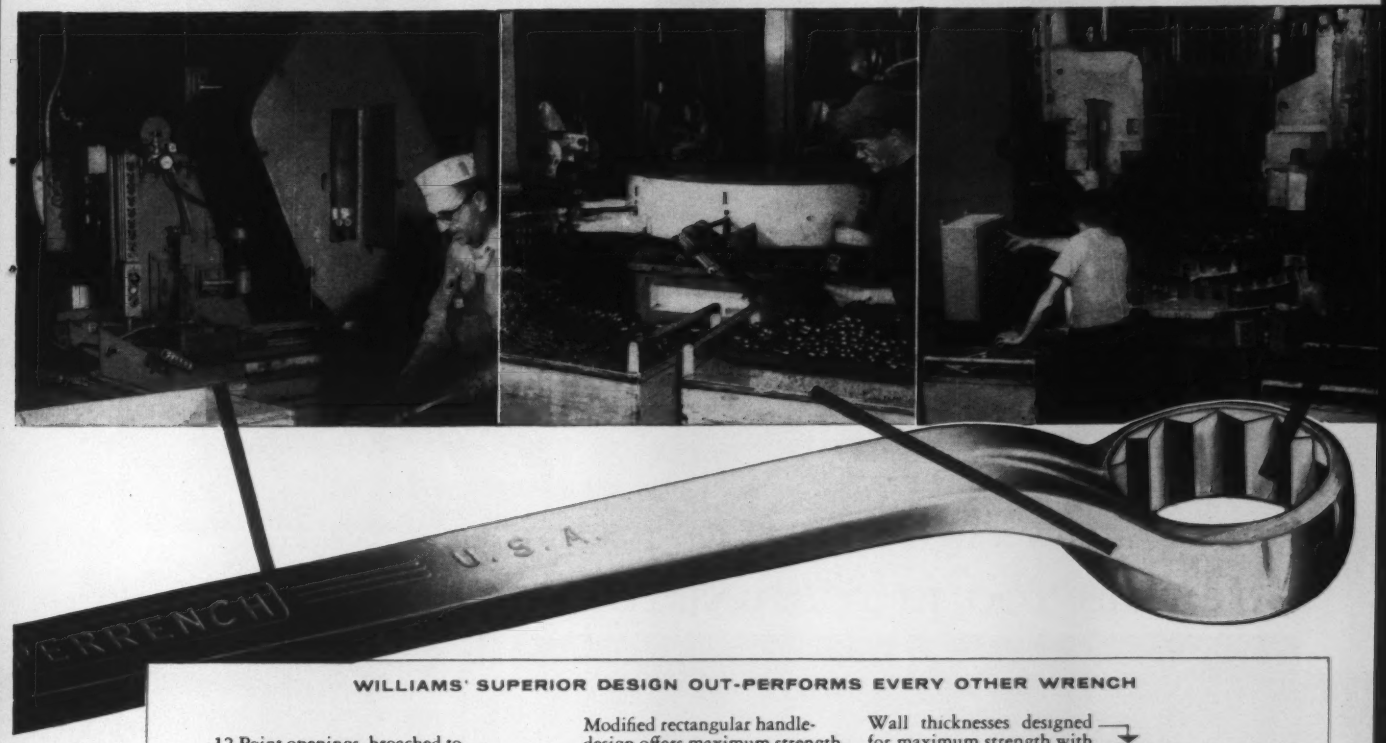


Special conveyorized heat-treating equipment automatically heats and quenches forgings in a series of salt baths to prevent decarburization and dimensional distortion often found in other wrenches. It further develops the relationship of toughness and hardness to the optimum.

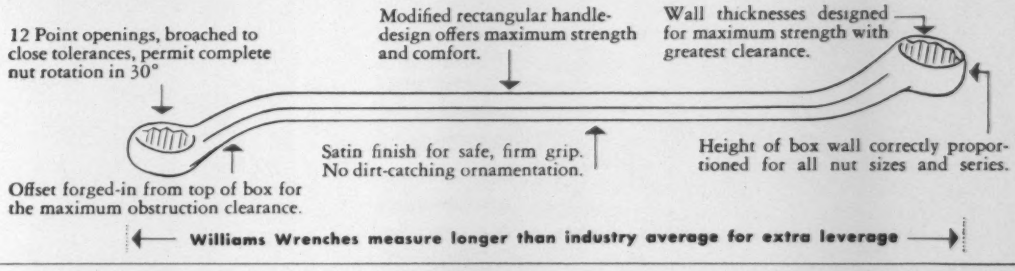
Feel and finish are refined on this automatic profiling machine. All rough edges are completely removed. Wrench handles are profiled to uniform dimensions and are blended into the heads for greatest strength.

Here wall thicknesses are machine-controlled to exact concentricities. This extra step produces heads offering uniform clearances from wrench to wrench... pattern to pattern.

Developed specially for Williams, this three station transfer machine drills, broaches and chamfers. Box openings are machined to tolerances well within industry standards for long-lasting, sure-grip fit.



WILLIAMS' SUPERIOR DESIGN OUT-PERFORMS EVERY OTHER WRENCH


12 Point openings, broached to close tolerances, permit complete nut rotation in 30°
Modified rectangular handle-design offers maximum strength and comfort.
Wall thicknesses designed for maximum strength with greatest clearance.
Satin finish for safe, firm grip. No dirt-catching ornamentation.
Height of box wall correctly proportioned for all nut sizes and series.
Offset forged-in from top of box for the maximum obstruction clearance.

Williams Wrenches measure longer than industry average for extra leverage

MR. WRENCH says:

SEND FOR THIS NEW JAM-PACKED CATALOG No. 304. Lists 4530 stock tools and forgings...wrenches of all kinds, power sockets, clamps, tool holders, hoist hooks, eye bolts, and many more...

THE BROADEST LINE OF ITS KIND

INDUSTRIAL DISTRIBUTORS · SERVING INDUSTRY ECONOMICALLY · THE RIGHT HAND OF PRODUCTION

WILLIAMS

TOOLS OF INDUSTRY

J. H. WILLIAMS & CO.
DIVISION OF UNITED-GREENFIELD CORPORATION
407 Vulcan Street, Buffalo 7, New York

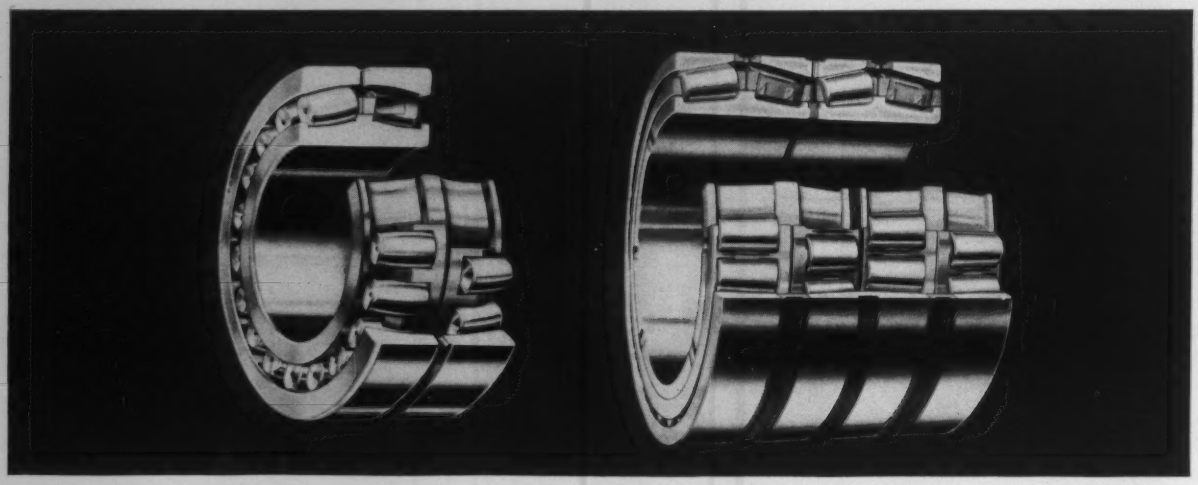
Mr. Wrench: Please send me your new illustrated catalog No. 304.

NAME_____ TITLE_____

FIRM_____

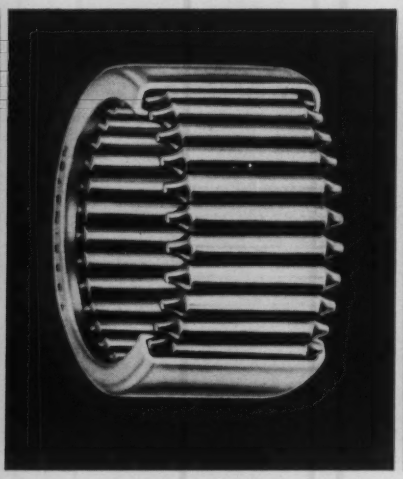
ADDRESS_____ ZONE____ STATE_____

YES, TORRINGTON IS A LEADING MANUFACTURER OF LARGE ANTI-FRICTION BEARINGS...

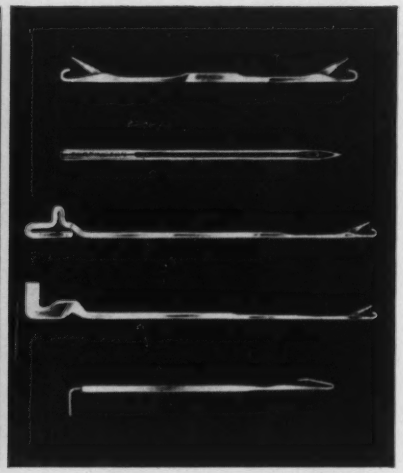


BUT THIS, TOO, IS TORRINGTON...

Foremost producer of small precision metal parts, manufactured by the millions to meet the mass demands of a variety of industries.



Pioneer manufacturer of the revolutionary needle bearings now used in countless products, from aircraft to home appliances.



America's largest manufacturer of machine needles for knitting, sewing, tufting and felting... and a leading producer of surgeons needles.

In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

Serving industry from plants located in the United States, Canada, England, Germany and Italy

BLAW-KNOX

Blaw-Knox designs and builds a full range of mills for the reduction of aluminum and other non-ferrous metals. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company. Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Ave., Pittsburgh 22, Pa.

32- and 56-inch x 96-inch, 4-high reversing hot strip mill at the Terre Haute plant of Anaconda Aluminum Company.

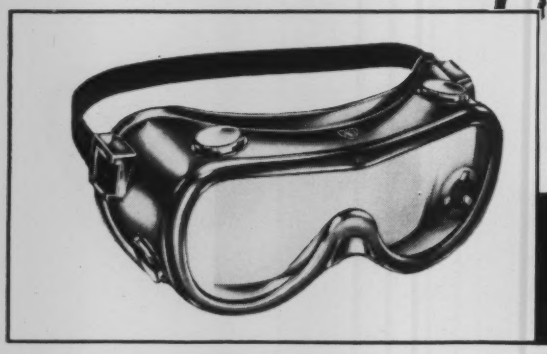
Allied Chemical Corporation* Cuts Eye Accidents 85% Saves Eyes, Lowers Costs with AO Protection Program

(*Plastics and Coal Chemicals Division, Frankford Plant, Philadelphia, Penna.)

When a company or plant can cut reportable eye injuries by 85% in 10 years (1948-1958) it wins in many ways. Because eye injuries average $432 in cost for compensation alone (Source: National Safety Council), a company lowers operating costs significantly. Annual savings well up in five figures are common. Add to these the savings in first aid, hospital and medical care and in the "hidden costs"** which are considerable.

What's the cost of protection? $2.65 is the average price of safety glasses. Put them on 1,000 production workers, for example for $2,650. Prevent just 10 eye accidents (savings in compensation *alone*, $4,320). *Net* savings, $1,670. An AO Eye Protection Program featuring the right safety standard frames and lenses for man and job is an investment with built-in savings. Write for new booklet, "Eyes Are Expensive Targets."

**Idle equipment charges, lowered production quality, increased spoilage, etc.

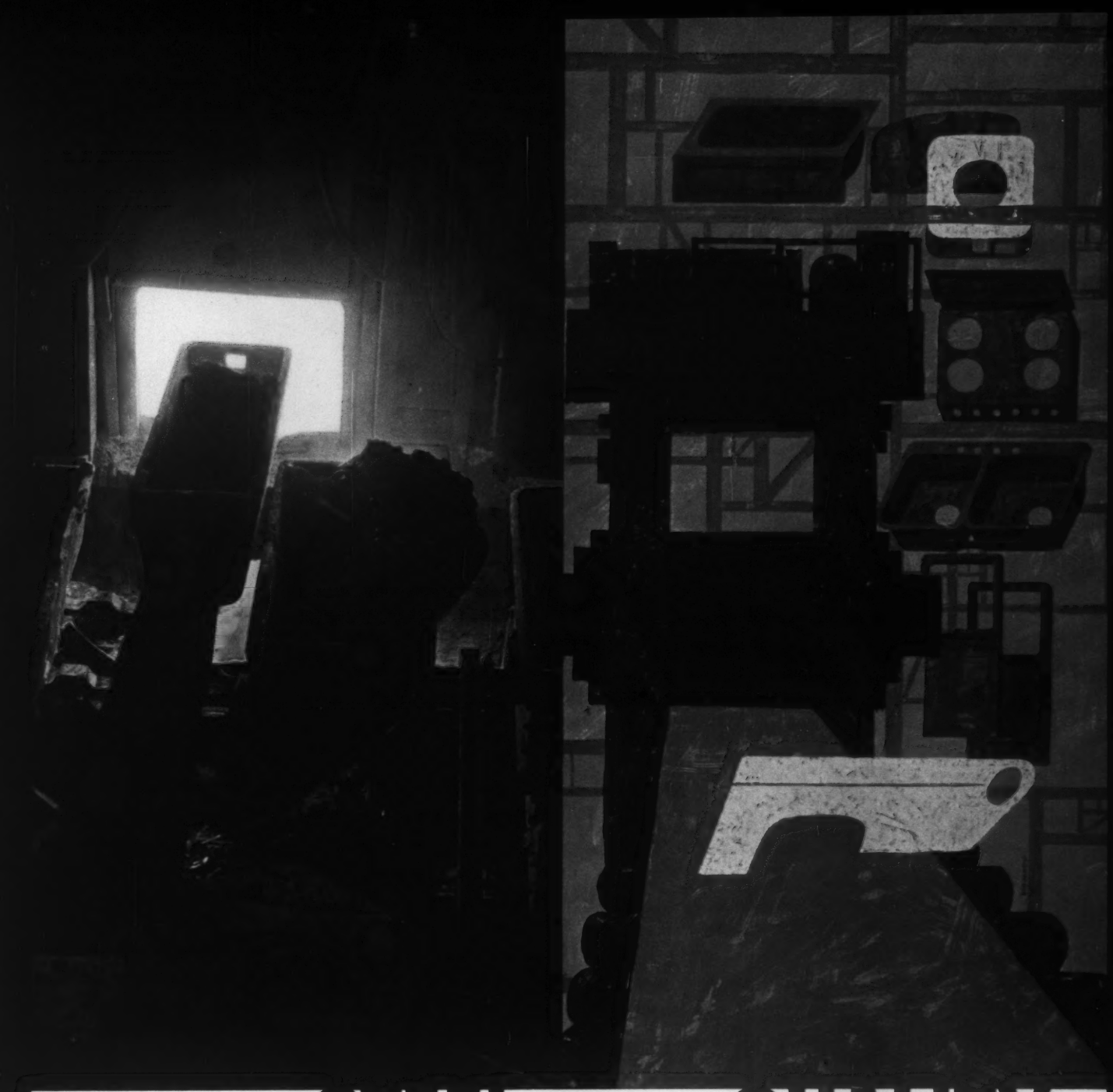


Always insist on AO Trademarked Safety Products

American Optical COMPANY
SAFETY PRODUCTS DIVISION
SOUTHBRIDGE, MASSACHUSETTS

Safety Service Centers in Principal Cities

Be Safe For Sure — With AO SURE-GUARD Products



STEEL

STEEL is a furnace, burning like the sun. It is a magic metal, born in fire. Steel serves you as no other low-cost metal can. It is everybody's metal. Steel. 2600 pounds of it in an average American car. 10,000 feet of it in an off-shore oil well. 2 pounds of it in a child's rugged toy. 16 inches of it in a handy, light tin can. Youngstown is carbon, alloy and Yoloy steel to cut, form, machine, stamp, weld or draw. Steel to build with, steel to use. From the furnaces of Youngstown, growing force in steel.

QUALITY

YOUNGSTOWN is steel plus quality. Physical quality that steel-eyed men in 39 Youngstown mills deliver. Chemical quality that specialists in metallurgy provide. Exacting quality that must meet the test of electronic devices. Cost-cutting quality that works with Youngstown service to help you design things better, to make things better. Youngstown steel is steel made for you, steel you can depend on. Quality steel. The kind you'd expect from modern and dynamic Youngstown, growing force in steel.

Youngstown – growing force in steel

THE YOUNGSTOWN SHEET AND TUBE COMPANY, YOUNGSTOWN, OHIO. ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND COLUMBUS DALLAS DENVER DES MOINES DETROIT GRAND RAPIDS HOUSTON INDIANAPOLIS KANSAS CITY LOS ANGELES MILWAUKEE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS SAN FRANCISCO SEATTLE TULSA WASHINGTON

SOLVING MATERIAL DESIGN PROBLEMS
HEAT RESISTANCE
A 5000° flame has not penetrated a one-quarter-inch piece of CDF's new Dilecto RD-105 laminate after ten minutes. The same thickness of cold-rolled steel is pierced in less than forty seconds.

Molded from graphite fabric impregnated with a heat (ablation)-resistant phenolic resin, new CDF grades RD-105 and RD-115 are being evaluated in solid propellant rocket motors.

Dilecto laminates are only one family of products from industry's largest selection of non-metallic structural materials and electrical insulations. Vulcanized fibre, silicone rubber, mica, Teflon*, and thermosetting moldings are also supplied by CDF.

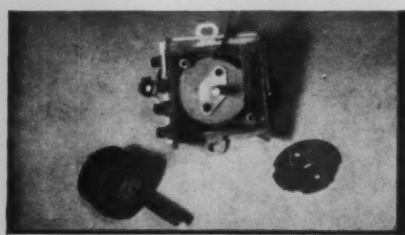
CDF can provide both quality and true economy in selecting plastic materials best suited to your needs. Refer to SWEETS PD file or write to us for General Folder 60.

*DuPont trademark

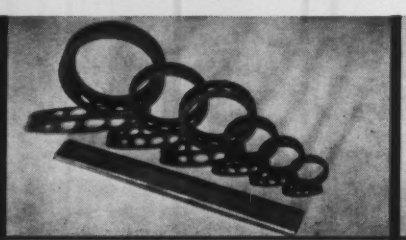
CDF®

CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 85, DEL.



Moisture-resistant and low cost Dilecto cams for automatic washer and dryer controls.



Dimensionally stable, light weight, oil-resistant Dilecto ball bearing retainer rings.

Easily fabricated paper-base, punching grade Dilecto precision switch insulators.

they turn in top performance to turn out top results

SIMONDS SA Borolon® TRADE MARK TOOLROOM WHEELS

for

- cool grinding
- heavy cuts
- long wheel life

For sharpening milling cutters, broaches, hobs, drills, reamers, etc., or surface grinding hard tool and die steels and special alloys, these wheels are second to none. And here's why. Each particle of SA Borolon aluminum oxide abrasive is a single, natural crystal. That means there are *more* cutting edges on the wheel face for fast, non-burning action and deeper penetration into the work. Also, being more friable, this unique abrasive fractures readily to increase its self-sharpening function, thus minimizing dressing and prolonging wheel life. Order SA Borolon Wheels from your Simonds distributor.

Write for Bulletin ESA 272

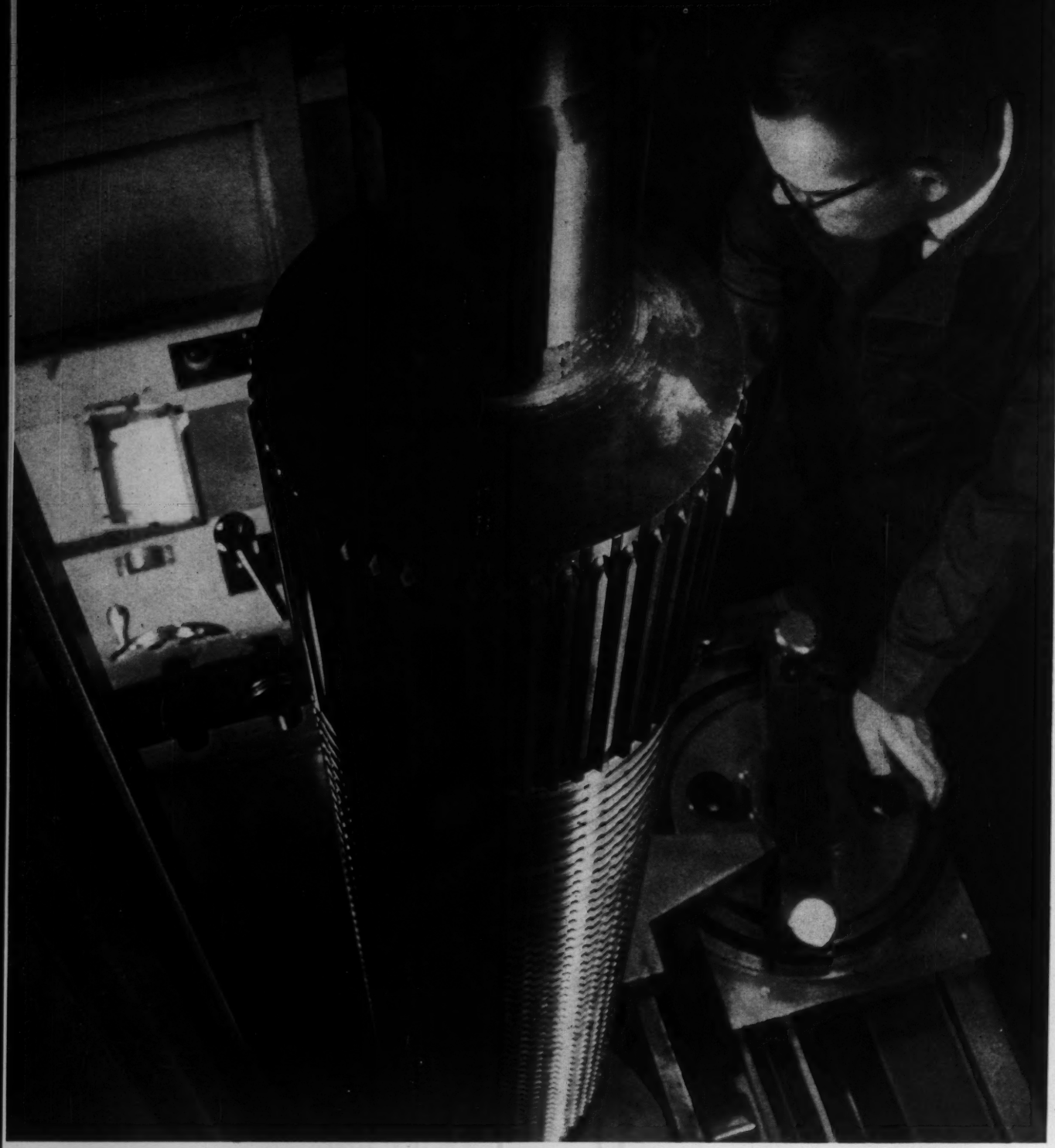
SIMONDS ABRASIVE CO.

PHILADELPHIA 37, PENNA.

COUNT ON / YOUR SIMONDS DISTRIBUTOR FAST SERVICE • LOCAL STOCKS

WEST COAST PLANT: EL MONTE, CALIF.—BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO SHREVEPORT—IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC

FROM CREATIVE CRUCIBLE: HIGH SPEED STEELS THAT MAKE BETTER TOOLS POSSIBLE



CHECKING THE INVOLUTE PROFILE OF A SPLINE BROACH. Broach's 6" pitch diameter is designed to cut 48 splines—hold accuracy of +.0002"-.000" on all splines for 30". This accuracy is possible on broaches up to 82" when made of Rex High Speed Steel.

NOW, BROACHES PRODUCE MORE PIECES FASTER

They're also producing pieces with finer finishes and greater accuracy – because they're made of continually-improved Rex® High Speed Steels.

New broach designs and new broaching machines now enable you to mass-produce complex shapes in a matter of minutes. Furthermore, every piece is finely finished to within micro-inch tolerances.

What is behind this development? It's the increased skill of the broach tool makers, combined with Crucible's progress in making better high speed steels.

To produce the fine steels needed for broaches, Crucible tool steel specialists make use of the most advanced electronic instrumentation available today. For example: they use precision instruments to control the temperature of the molten metal in the melting furnace. So, each heat is produced under identical conditions.

CHECKING THE TOOTH SPACING OF HELICAL INVOLUTE SPLINE. Finishing teeth on broaches made of Rex High Speed Steels reproduce shapes within tolerances of a few ten-thousandths of an inch.

Crucible tool steel specialists employ new techniques that greatly improve deoxidation of the liquid steel. They also use new ingot mold designs that provide freedom from segregation when the steel solidifies. And they ultrasonically inspect every billet of Rex High Speed Steel before rolling or forging.

Today Rex High Speed Steels continue to make the best broaches because they offer *1.* more uniform distribution of carbides throughout the section. This ensures minimum size change, greater predictability in heat treatment, greater hardenability and more uniform hardness in the heat-treated tool. And *2.* more uniform distribution of sulfides in the free-machining grades—which provides improved machinability and superior surface finish.

To make precision tools better with Crucible's Rex High Speed Steels, call or write the nearest Crucible branch office or warehouse.

BETTER TOOLS, THROUGH BETTER STEELS. The constant improvement of Rex High Speed Steels ensures the increasingly better performance of hobs, taps, twist drills and cutters—as well as broaches.

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Caldwell, N. J. • Charlotte Chicago • Cincinnati • Cleveland • Columbus • Dallas • Dayton • Denver • Detroit • Erie, Pa. • Grand Rapids • Houston • Indianapolis • Los Angeles Miami • Milwaukee • Minneapolis • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City San Francisco • Seattle • Springfield, Mass. • St. Louis • E. Syracuse • Tampa • Toledo • Tulsa

WHAT'S YOUR C.I.Q.?*

TAKE THIS SIMPLE TEST TO FIND OUT

KNOWING THE CORRECT ANSWERS TO QUESTIONS ABOUT CANCER COULD SAVE YOUR LIFE

1 Leukemia is cancer of the blood-forming tissues.	TRUE	FALSE
2 All forms of life, including plants, can develop cancer.	TRUE	FALSE
3 Cancer is not contagious.	TRUE	FALSE
4 More men than women die of cancer.	TRUE	FALSE
5 Pain is a late cancer symptom.	TRUE	FALSE
6 Cancer can strike anyone at any age.	TRUE	FALSE
7 A biopsy (examination of suspected tissue removed from the body) is the only method of proving whether cancer is present.	TRUE	FALSE
8 Surgery or irradiation, or both, are the only means of curing cancer.	TRUE	FALSE
9 An annual health checkup is one of the most effective weapons against cancer.	TRUE	FALSE
10 Over one million Americans are alive today, cured of cancer.	TRUE	FALSE

SCORING: 10: Excellent
6 to 9: Fair
5 or less: Danger! For your own protection, learn more about cancer. Write to "Cancer" —c/o your local post office.

AMERICAN CANCER SOCIETY

ANSWERS: ALL TEN OF THESE STATEMENTS ABOUT CANCER ARE TRUE.

*CANCER INTELLIGENCE QUOTIENT

That's a test pilot undergoing several "G's" in one of those human centrifuges. His life and the progress of future generations depend on the performance of many tubular parts built to rigid specifications, tight tolerances.

We make stainless steel and nickel tubing in mechanical, aircraft, capillary and hypodermic grades in sizes up to 1 inch OD—plus an amazing variety of "specialties" such as super and "exotic" alloys, glass-to-metal sealing alloys and clad metals.

In addition, we produce a vast line of platinum products and chemicals that have been used by industry for over a century.

We are unique because of our ability to *work these metals to such tiny, precise forms.* Bulletin No. 12 describes our tubular products—Catalog No. 5 describes our platinum products. Write for them.

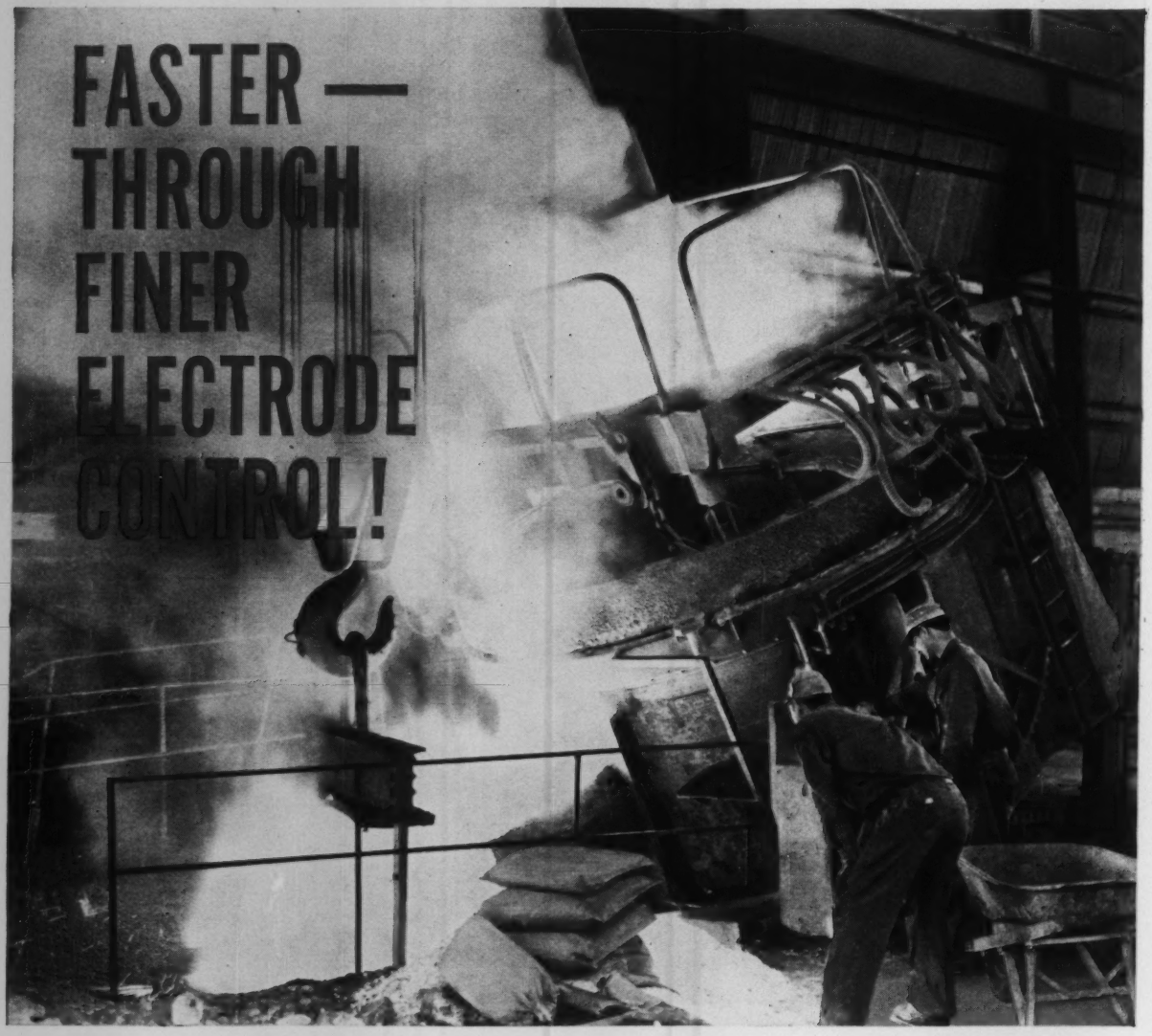
BISHOP

Tubular Products Division **J. BISHOP & CO.** *platinum works* 35 KING STREET, MALVERN, PENNA.

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

FLORIDA STEEL CORP., TAMPA, SELECTS HYDRO-ARC ELECTRIC FURNACE FOR FLORIDA'S FIRST STEEL MILL!

FASTER — THROUGH FINER ELECTRODE CONTROL!



Hydro-Arc electric furnaces, from Whiting, give you full-time arc efficiency, faster heats, more wattage turned into melt, lower electrode consumption, virtually no electrode breakage. Arc adjustment is instantaneous. Mechanical lag? Almost totally eliminated by non-stop, non-reversing electrode motors plus vital air counter-balance. Here's Whiting's new concept in low-cost electric melting—new, yet fully proven for your benefit in steel mill after steel mill. Look into Hydro-Arc now!

Get Details in Hydro-Arc Catalog No. FY-168, or ask a Whiting furnace engineer to call. No obligation. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

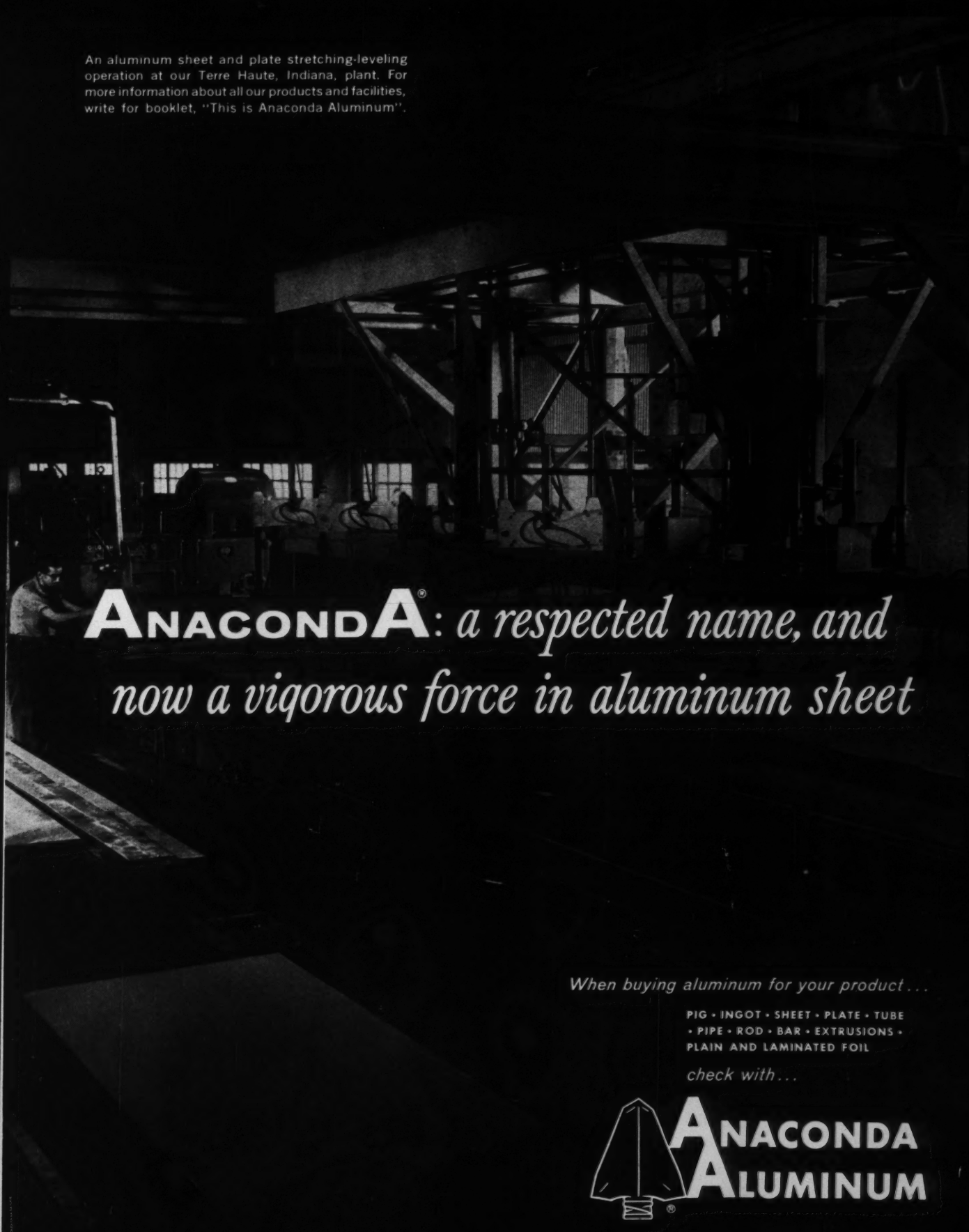
See Our Catalog in SWEET'S

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

ELECTRIC FURNACES

WHITING

MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES®; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT



An aluminum sheet and plate stretching-leveling operation at our Terre Haute, Indiana, plant. For more information about all our products and facilities, write for booklet, "This is Anaconda Aluminum".

ANACONDA®: *a respected name, and now a vigorous force in aluminum sheet*

When buying aluminum for your product...

PIG • INGOT • SHEET • PLATE • TUBE • PIPE • ROD • BAR • EXTRUSIONS • PLAIN AND LAMINATED FOIL

check with...

ANACONDA ALUMINUM®

ANACONDA ALUMINUM COMPANY • GENERAL OFFICES, LOUISVILLE 1, KENTUCKY

are you shock-proof?

Ever sit in a traffic-trapped taxi for an hour . . . only to find your destination was just around the corner? Ever build a patio . . . only to find a contractor would have done it for less than the cost of your materials? Ever sweat six months over a problem on the job . . . only to find the solution had been available by picking up the phone?

Carpenter can't shock-proof you from everything, but we *can* help you with the application of electronic, magnetic and electrical alloys. No matter how difficult your problem, there's an excellent chance that our continuing research and development program has already produced information to save you time and money.

In addition to leading the field in technical assistance to industry, *Carpenter* also provides the convenience and reliability of one-source supply. You name it—dimensional control, resistance control, magnetic control—*Carpenter* offers the world's widest range of alloys to meet your most critical needs.

Carpenter alloys provide easy, fast fabrication, such as blanking, edge-winding, spot-welding and machining. And you waste no time experimenting to find the proper heat treating methods and temperatures. Highly specialized as these alloys are, *Carpenter* has "standardized" their properties to minimize problems from design to delivery.

Why not check *Carpenter now* . . . instead of later?

tool and die steels
stainless steels
high temperature alloys
electronic, magnetic and electrical alloys
special-purpose steels
tubing and pipe
fine wire specialties

Carpenter steel

a new company 70 years old

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

We have the facilities; the know-how is free

Consider these three, of many, reasons why it is to your advantage to let us fabricate your laminated plastics parts.

First, we have the facilities for the job. Saws, millers, drills, lathes, punch presses, planers, sanders. Hundreds of them. Many are standard machine tools modified to machine laminated plastics quickly and easily. Others are special, designed primarily for the high-speed production possible with laminated plastics.

Second, behind the machines are people who know practically every trick in the book for turning out a first-class job fast. They also know what to avoid doing.

Finally, it will hardly pay you to handle your own fabrication—in terms of money, in headaches, in possible errors, waste or delays. Call a Synthane representative near you for a quotation—you'll find him in any principal city or write Synthane Corp., 56 River Road, Oaks, Pa.

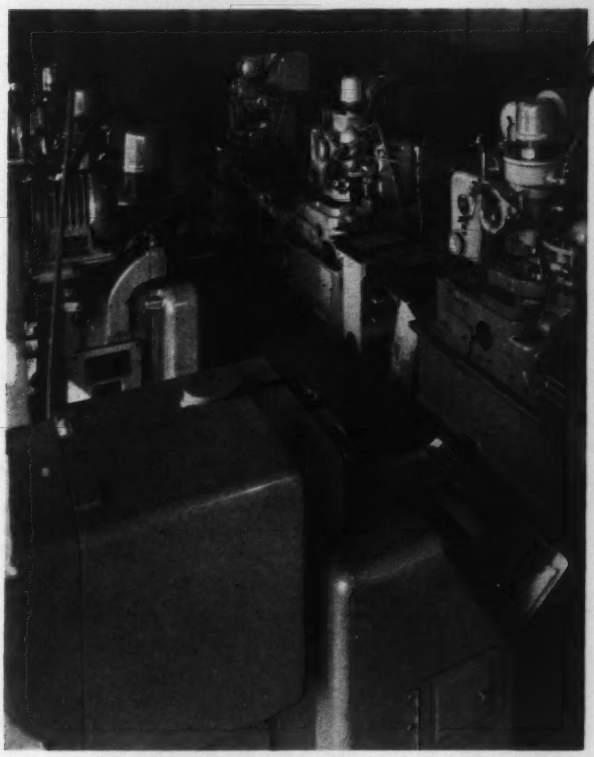
You furnish the print—we'll furnish the part

SYNTHANE
CORPORATION OAKS, PENNA.

Sheets • Rods • Tubes • Fabricated Parts
Molded-laminated • Molded-macerated

FELLOWS GEAR PRODUCTION EQUIPMENT

Builds Extra Quality at Lower Cost for STANLEY



View of production floor at Stanley Electric Tools, showing some of the Fellows Gear Production Equipment used.

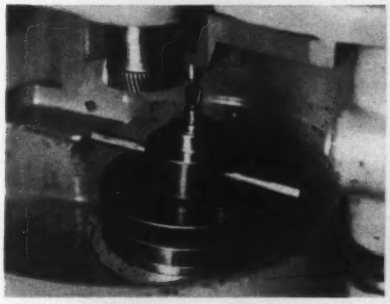
Stanley is a name you know . . . a name that stands for high quality in electric tools.

To insure this quality, while providing the high production rates that mean lower costs, Stanley Electric Tools, Division of The Stanley Works at New Britain, Conn., uses Fellows Gear Production Equipment for shaping, shaving and inspecting the armature pinions for its electric tools.

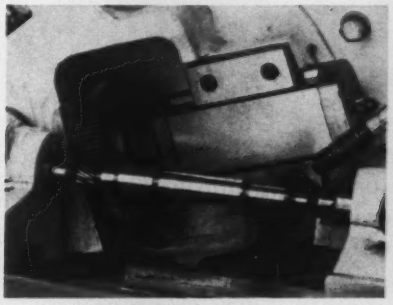
Fellows has long been the leader in Gear Production Equipment, with machines for every gear production job: Fellows Gear Shapers, Pfauter Gear Hobbers, Fellows-Reishauer Gear Grinding Machines, Fellows Gear Shaving Machines and Fellows Inspection Instruments.

If you make gears of any size, from 1/16″ P.D. to 120″ P.D., Fellows' 60 years of experience can help you improve quality and cut costs. For complete information on Fellows Gear Production Equipment, call your nearest Fellows office.

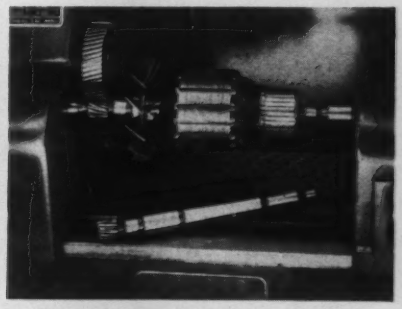
THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Avenue, Royal Oak, Mich.
150 West Pleasant Avenue, Maywood, N. J.
5835 West North Avenue, Chicago 39
5214 West Manchester Avenue, Los Angeles 45



SHAPING. The versatile No. 7125 Fellows Gear Shaper gives Stanley high production speeds (up to 450 strokes per minute). It also provides fast, simple changeover from one job to another.

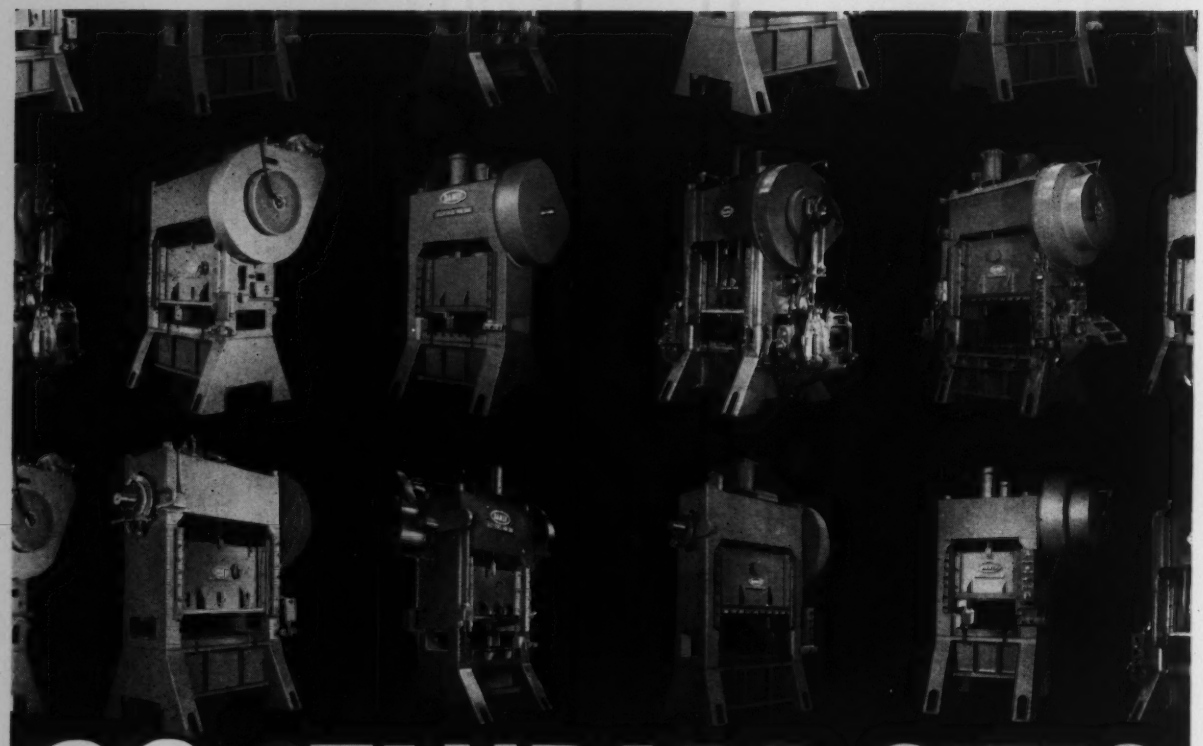


SHAVING. The No. 4 Fellows Fine Pitch Shaving Machine puts finishing touches on each pinion and adds the finish which results in long life and quiet operation.



INSPECTING. The No. 4 Fellows Fine Pitch Red Liner makes and records a composite check of gear accuracy, insuring high quality standards.

THE PRECISION LINE **Fellows** *Gear Production Equipment*



90 STANDARD SIZES

in a Custom-Quality Press

Take your choice of dependable Danly SC crankshaft presses in capacities from 50 to 300 tons...bed areas to 72″ x 60″...with strokes to 16″...constant or variable speeds to 90 SPM... with non-geared, single or double-geared drives...equipped for manual or automatic feed.

Every SC press gives you Danly's patented low-maintenance air-friction clutch, husky welded-steel frame, and countless other custom-quality features.

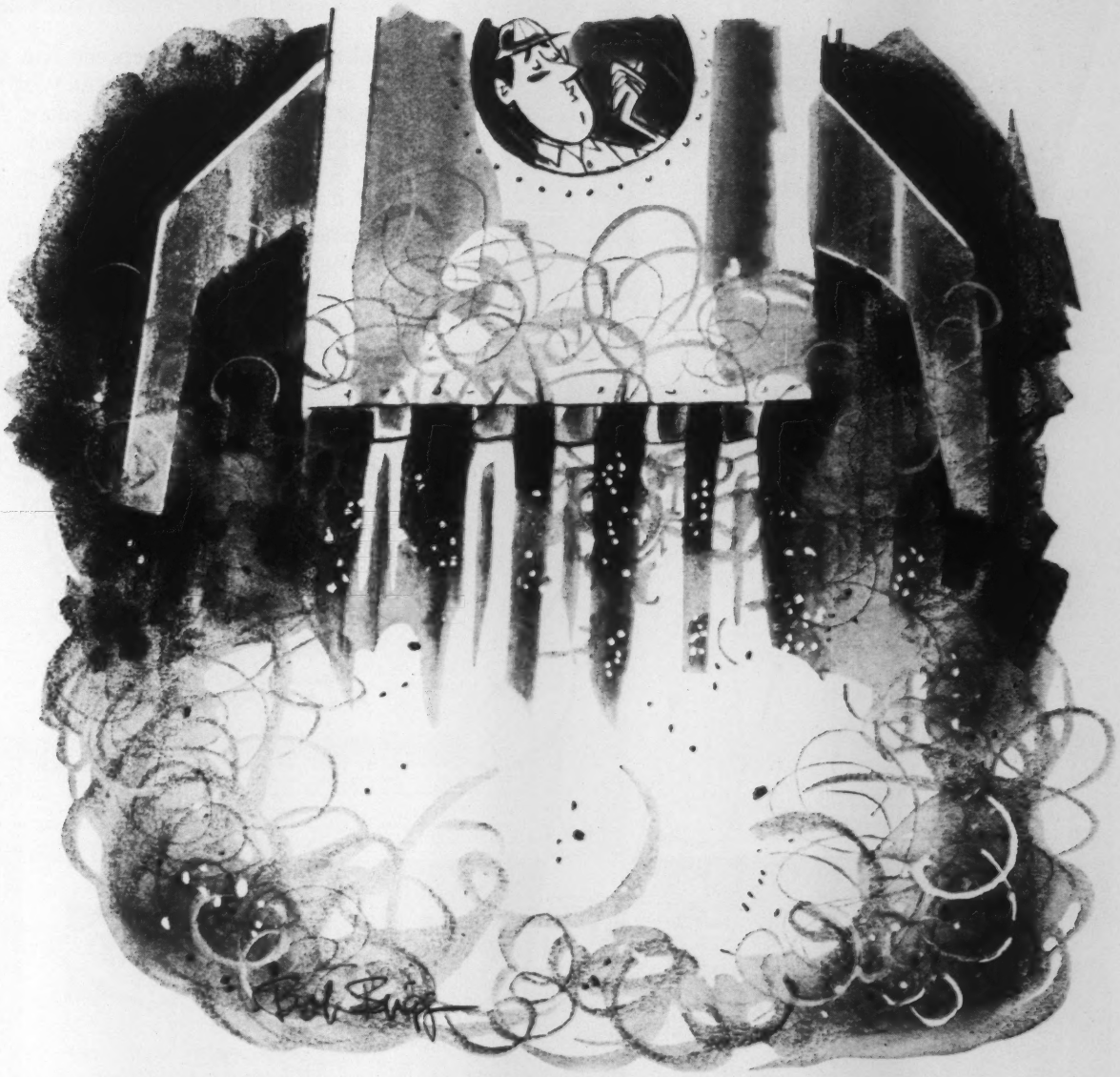
For low-cost piece part production ...in blanking, drawing, piercing, forming, or progressive die stamping... you'll find your choice of Danly SC Presses ahead of the field and best for you. WRITE FOR NEW SC CATALOG and get all the details.

MMT-PE

DANLY

DANLY

DANLY MACHINE SPECIALTIES, INC., 2100 S. LARAMIE AVE., CHICAGO 50, ILLINOIS



Steel's best friend

when the heat's on... *Vancoram Columbium Alloys!* High-quality stabilized stainless and heat-resistant steels perform best with an efficient alloy like columbium. VCA's special process for production of Vancoram Ferrocolumbium keeps undesirable elements at levels well within accepted standards. VCA supplies columbium in regular ferroalloy or in exothermic form, both of which have an exceptionally high columbium content.

THERMOCOL® (Exothermic Ferrocolumbium) saves you up to $7 a ton because of high columbium recovery and reduction in furnace time. It permits large amounts of alloy to be added with minimum temperature loss, and without contact between alloy and furnace slag. Write for more information about the special advantages offered by Vancoram Columbium Alloys. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. · Chicago · Cleveland · Detroit · Pittsburgh

Be sure to visit our Booth (No. 1414) at the AFS Castings Congress, Philadelphia, May 9-13.

VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

VANCORAM

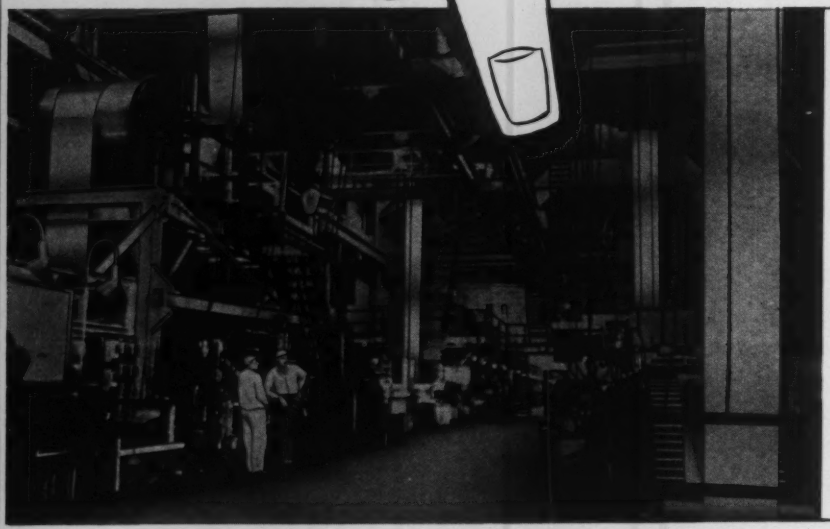
What makes the difference between one galvanizing line and another? How can you save money on the purchase of a Continuous Galvanizing Line? What are the different components that must be considered in the designing of a line?

Aetna-Standard answers these and other questions in this new booklet on Continuous Galvanizing Lines. Other information includes information on the number of lines operating in the world; and pictures of different components of Continuous Galvanizing Lines.

A copy will be mailed promptly upon receipt of your request. BLAW-KNOX COMPANY, Aetna-Standard Division, Pittsburgh, Pennsylvania.

BLAW-KNOX

Aetna-Standard Division
BLAW-KNOX

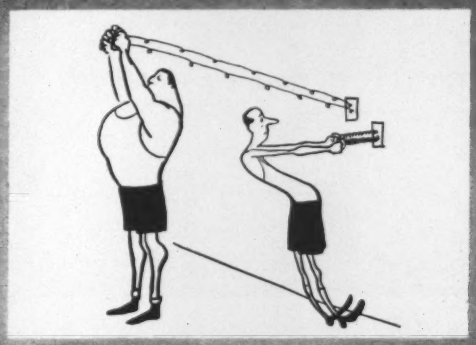


BLAW-KNOX

THE WORLD'S LEADING DESIGNER AND BUILDER OF CONTINUOUS GALVANIZING LINES

Aetna-Standard Division
BLAW-KNOX

VISCOSITY COIL



EXECUTIVE COILS

SAFARI COIL

What do "Coils" mean to you?

Coils call to mind so many things. But if to you they mean springs, those mechanically precise activators of energy, then we're on common ground. Our organization specializes in all kinds—compression, extension, torsion, flat coil, volute . . . maintains unequalled engineering and manufacturing facilities throughout the nation. So let us supplement the work of your own engineers with our specialized knowledge and experience in the design and manufacture of springs, small stampings, and wire forms . . . made to your specifications.

Our "Picture Book of Springs" shows thousands of custom-produced parts, typical of our service. Write for a copy to pass along to interested people in your organization.

5935

Associated Spring Corporation

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Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
F. N. Manross and Sons Division, Bristol, Conn.
Dunbar Brothers Division, Bristol, Conn.
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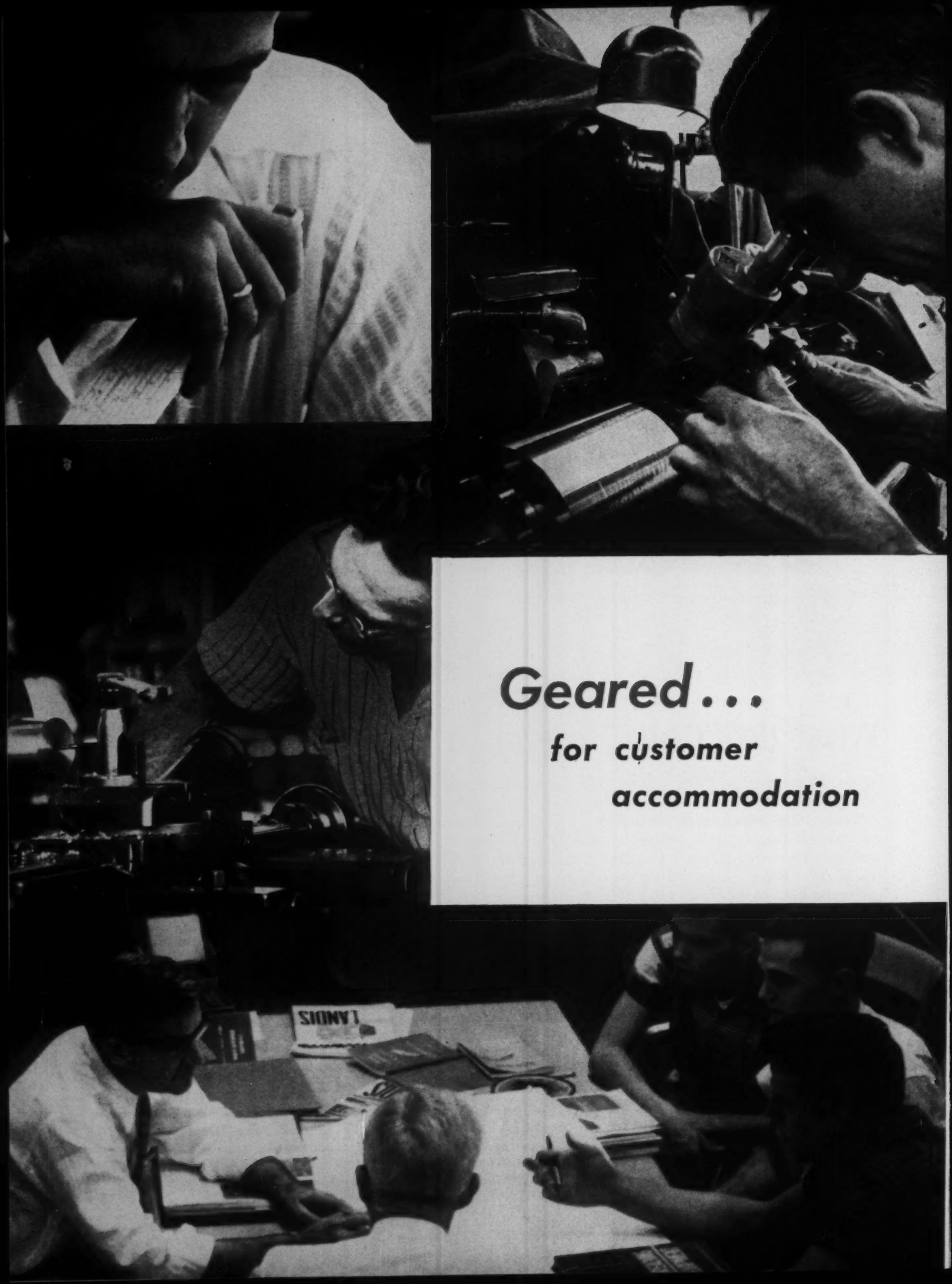

Geared...

for customer accommodation

Design and Delivery; Production Scheduling; Sales and Service; Engineering and Research; in every phase of our entire operation, our efforts are specifically primed for customer satisfaction.

And although Landis maintains the world's largest operation in its field, we know that size alone does not necessarily insure customer satisfaction. We know that *adequate* inventories, delivery when *promised*, service when *needed*, *skilled* engineering, continuous *research*, *precision* tools and machines, and personnel who *really* care are things that Landis' customers want, need, and expect. That's why we've set up our operation to supply those needs—supply them better, faster, more efficiently. And that's why Landis, with more than 50 years experience in designing, building, and servicing Threading Equipment, has become the acknowledged leader in its line.

If you are faced with the need of additional equipment for expanded threading operations, or new operations that require specialized design and engineering, or any problem concerning threading equipment or service—call LANDIS.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

Threading Machines

Taps—Collapsible & Solid Adjustable

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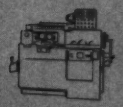

Thread Rolling Machines

Die Heads—Rotary & Stationary

Thread Rolling Tools

MMT-PE

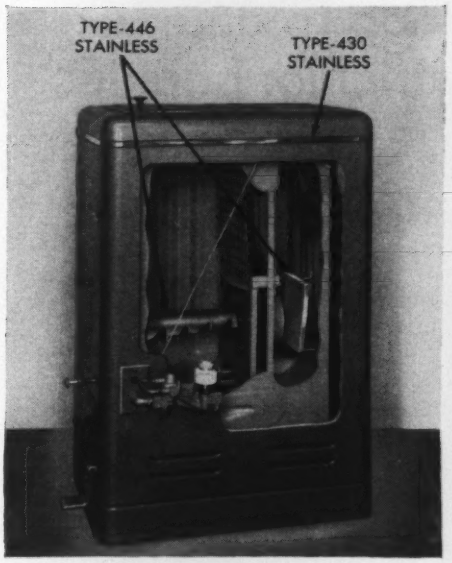
BOOTH NO. 432

VIRTUALLY MAINTENANCE-FREE inner and outer walls for self-service, refrigerated food sales cases results from use of Republic Galvannealed Sheets. Tight, uniform zinc coating takes all forming operations. Smooth, spangle-free surface provides excellent paint-adhering qualities. The material is strong, highly ductile, yet offers low initial cost. Contact your Republic representative or mail the coupon for complete information.

CONSISTENT PAINT-HOLDING CAPACITY makes Republic Electro Paintlok® ideal for water cooler housings, exterior panels for appliances, cabinets for home, commercial, and industrial applications. Produced by electro galvanizing and chemically treated to assure best possible paint adherence, Paintlok Sheets are shipped from the mill in prime condition for painting. Send for details.

Profit-producing ideas for the manufacturer . . .

REPUBLIC STEEL SHEETS PROVIDE UNIFORM QUALITY FOR SUPERIOR FABRICATION



LONG BURNER LIFE in new Imperial Calcinator Home Incinerators is assured by Republic ENDURO® Type 446 Stainless Steel. Used in burner shields, the stainless is satisfactorily resistant to temperatures reaching 2000°F. . . . resists most forms of corrosion and undergoes a minimum of distortion. For added sales appeal, Calcinator uses Republic Type 430 Stainless Steel for trim around the top of the incinerators.

UNIFORMLY TIGHT ZINC COATING on Republic Continuous Galvanized Sheets won't crack, flake, or peel under any fabricating operation permitted by the base metal. For long life and consistently high quality, investigate Republic Continuous Galvanized Sheets.

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World's Widest Range of Standard Steels and Steel Products

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1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

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☐ Galvannealed ☐ Stainless Steel ☐ Electro Paintlok

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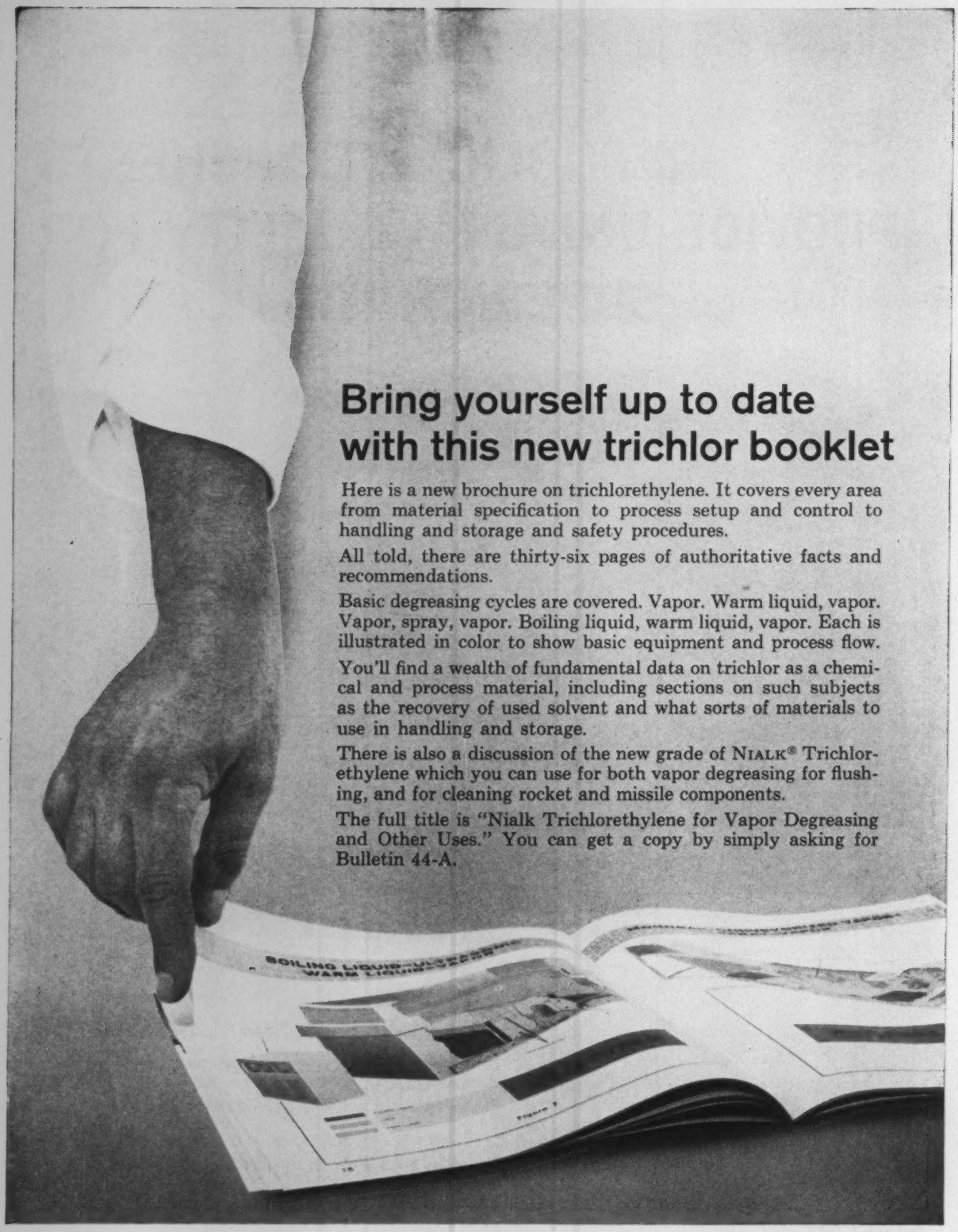

Bring yourself up to date with this new trichlor booklet

Here is a new brochure on trichlorethylene. It covers every area from material specification to process setup and control to handling and storage and safety procedures.

All told, there are thirty-six pages of authoritative facts and recommendations.

Basic degreasing cycles are covered. Vapor. Warm liquid, vapor. Vapor, spray, vapor. Boiling liquid, warm liquid, vapor. Each is illustrated in color to show basic equipment and process flow.

You'll find a wealth of fundamental data on trichlor as a chemical and process material, including sections on such subjects as the recovery of used solvent and what sorts of materials to use in handling and storage.

There is also a discussion of the new grade of NIALK® Trichlorethylene which you can use for both vapor degreasing for flushing, and for cleaning rocket and missile components.

The full title is "Nialk Trichlorethylene for Vapor Degreasing and Other Uses." You can get a copy by simply asking for Bulletin 44-A.

HOOKER CHEMICAL CORPORATION
304 Union Street, Niagara Falls, New York
Sales Offices: Buffalo Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Massachusetts
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HOOKER CHEMICALS PLASTICS

PLANNED MASS-HANDLING

Your immediate attack against rising costs

YOU WILL MOVE SO MANY MORE TONS of materials—so much faster—that your savings multiply amazingly from the very first day you operate a big-capacity Gerlinger fork lift truck. By coordinating the mobile power of job-proved Gerlinger equipment with the handling of your heaviest loads, you profit immediately in time, space and dollars saved. Write for case studies that show you how companies similar to yours are reducing costs through more effective handling operations. TOWMOTOR CORPORATION, CLEVELAND 10, OHIO.

RENT or LEASE

your Towmotor-Gerlinger equipment. Increase profits without tying up working capital. For information contact Towmotor-Gerlinger Rental Division, Towmotor Corporation.

FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

TOWMOTOR® THE ONE-MAN-GANG -GERLINGER*

*Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

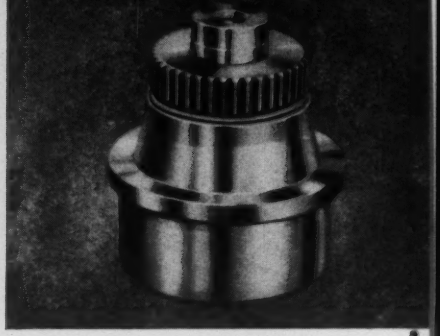
UNBRAKO

INDUSTRIAL FASTENERS like this Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.

SPS AIRCRAFT

AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other lightweight, high-strength exotic metals.

SPS NUCLEAR



NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

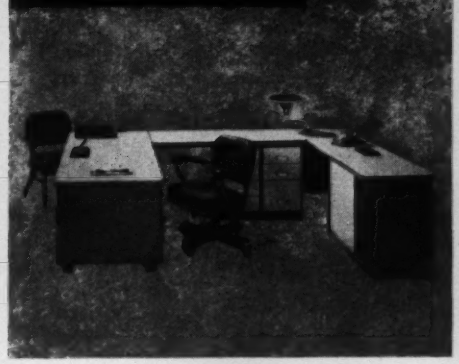
SPS quality control proves

Acid etch and magnetic particle tests are performed by SPS quality control experts like Rouse Roberts, shown here examining grain flow of the metal in a socket screw cross section.

HALLOWELL

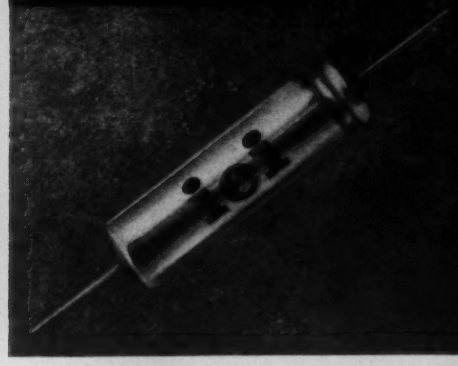
SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

COLUMBIA



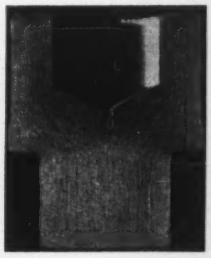
OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

I. E. I.



CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.

reliability is more than skin deep



A hundred times a day, Rouse Roberts, "Mr. Reliability", peers through his microscope to check grain flow in fasteners.

All around his quality control station, huge machines form UNBRAKO Socket Head Cap Screws.

Before and during every production run, fasteners from each machine must pass his tests. He cuts a cross section of the cap screw head . . . etches it with acid . . . and examines it under a microscope. Special lighting reveals the grain flow of the metal.

Flow lines that bend around the fillet with no interruptions indicate a strong, reliable, forged head. Satisfied with the grain flow, "Mr. Reliability" then runs a magnetic particle test to reveal hidden cracks or flaws.

Just three minutes cover both tests. At any time, a signal from Rouse can shut down a machine until its production once again meets SPS reliability standards. And there is a "Mr. Reliability" in every SPS production department.

This is the kind of painstaking, quality control that has made SPS today's leading producer of high reliability fasteners for the demanding '60's.

The new 18-page booklet, "Evolution in Socket Screw Design", will explain this development to you in much greater detail. Write for a copy now.

UNITED STATES

CANADA

SPS

where reliability replaces probability

GREAT BRITAIN

EUROPE

STANDARD PRESSED STEEL CO., Jenkintown, Pa., Santa Ana, Calif. • The Cleveland Cap Screw Company, Cleveland, O. • Columbia Steel Equipment Div., Fort Washington, Pa. • International Electronic Industries, Inc., Nashville, Tenn. • National Machine Products Div., Utica, Mich. • Standco Canada, Ltd., Toronto, Canada • Unbrako Socket Screw Co., Limited, Coventry and Sheffield, England Unbrako Schrauben GmbH, Dusseldorf and Koblenz, W. Germany.

Alcoa puts the metal where you want it

How BIG an impact have you seen lately? Alcoa can now make them up to 12 in. in diameter and 60 in. long.

When Alcoa's new 2,500-ton press hits an aluminum alloy slug, a giant impact is formed with the combined strength of an extrusion and forging.

Like their small brothers, these big new impacts can save you money. They are produced in one fast operation. There's no parting line to be ground. No scale to be removed. No draft to be cut off. Impacts have forged bases and extruded sections. Multiple parts can often be combined into one integral impact eliminating welded or mechanical joints. Machining is reduced, and excessive material waste is eliminated.

You can get these big new Alcoa® Impacts in many alloys with tensile strengths up to 75,000 psi. Also made from aluminum powder metallurgy alloys which provide excellent properties at elevated temperatures.

Alcoa Impacts are unfailingly sound. They have smooth, corrosion-resistant surfaces. You can have them in plain or complex shapes with design features combining those of forgings and extrusions—flanges, steps, multiple walls, bosses, ribs.

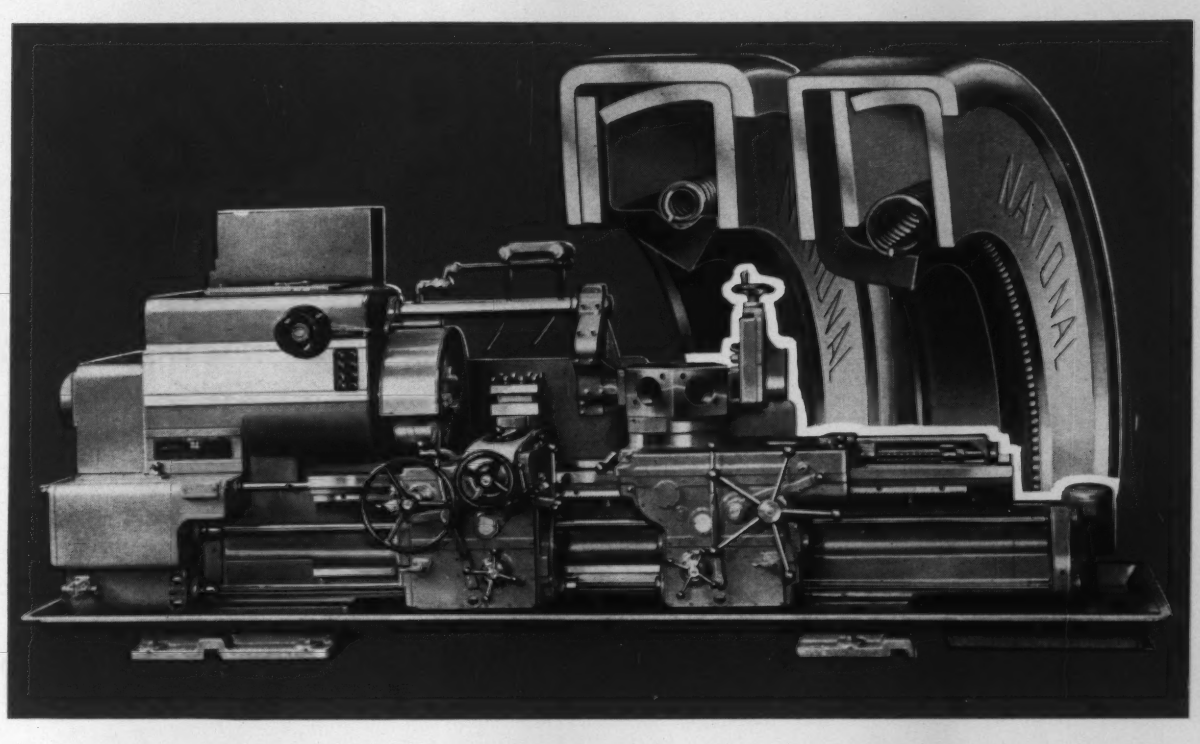
In impacts, as well as forgings, castings, extrusions and screw machine parts . . . Alcoa puts the metal where you want it. A call to Alcoa can mean ingenious design solutions. Start now; write for *Metal in Motion*, Alcoa's new 34-page brochure on impacts. Aluminum Company of America, 907-D Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM

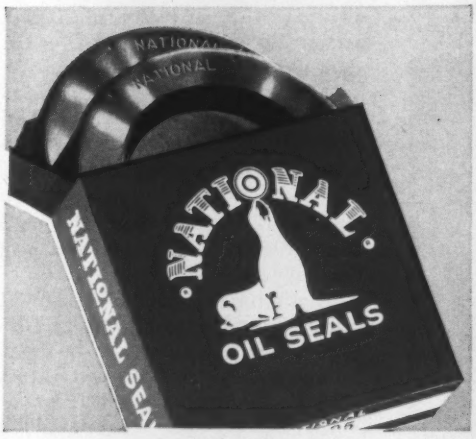
ALUMINUM COMPANY OF AMERICA

Alcoa puts the metal where you want it . . . in impacts, castings, forgings, extrusions and screw machine parts.

Better products, *faster,* from your Bearing Specialist:



Install National Oil Seals...low cost protection to keep machine output at peak levels



Your Bearing Specialist will help you set up a working stock to handle repair jobs in a hurry

You can depend on National Oil Seals to lengthen vital bearing life, cut downtime losses, and help hold production schedules. They're made to seal *in* lubricant, and seal *out* abrasive dirt. The key to this protection guarantee is the quality construction of every National Oil Seal.

National *Micro-Torc* Seals feature specially processed leather that stays flexible, lasts longer, and runs cooler. *Syntech* rubber seals are specially blended to meet exacting conditions of temperature, shaft speed, and other critical factors. Both types come in all sizes and are always available for fast delivery whenever you need them. Call your Bearing Specialist. He's nearby for ready help.

NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

NATIONAL OIL SEALS

Wispy but precise as the pattern they make on this gummed pallet are carburetor pump springs coiled from Johnson Steel's .014 tin-coated music wire.

Johnson Steel's Wire Is In Springs That Are . . .

'Out Of This World'

Mid-West Spring relies on Johnson Steel's Music Wire to make precise springs for satellites to sewing machines.

Trouble is their business . . . customers' trouble, that is—even in Outer Space.

That's the approach of Mid-West Spring Manufacturing Co. of Chicago, a firm that goes after the tough jobs with the help of Johnson Steel & Wire Co., its major supplier.

"We want the job the others can't do, whether it's a spring for a space missile or for a thermostat in your home," says R. H. Muehlhausen, vice president of sales.

Full range of Johnson Steel's specialty wires stocked at this warehouse guarantees same-day delivery to wire users in Chicago area.

of them literally "out of this world," performing functions in missiles and satellites now in orbit. Other products of the firm's three plants are used in farm implements, business machines, furnace controls, autos, home appliances and various electronic devices.

Mid-West uses the full range of Johnson Steel's music wire, from .003 to .300 inch, in all finishes. Every coil is checked first with a pilot spring, next at set-up on the coiler and finally at random in production. Some special springs get 100 percent electronic testing.

Roland Parduhn, Mid-West's methods engineer, says:

"We watch tensile strength, surface condition and size very closely. Any deviation or defect, and too many springs would vary from their designed load. We depend on Johnson Steel to maintain consistent quality."

This applies especially to one of the company's biggest production run items—a tension spring for the Anderson Co. of Gary, Ind., supplier of ANCO windshield wiper blades and arms to the automobile, truck, bus and aircraft industries.

• **Coils for Precise Control**—The spring precisely controls the pressure of the wiper on the glass. Too much pressure and the wiper will stall; too little and it will flutter in the wind.

Mid-West's production of this spring—numbering in the millions—represents a rugged performance test, but Johnson Steel's music wire is its match.

The help that Johnson Steel gives Mid-West Spring in its production processes can be duplicated for your advantage. Whether your need is music wire, or any of the many other products in Johnson's complete line of specialty wires, the benefits start the moment your order is received.

A national sales staff is ready to help you quickly and profitably with any application. Contact the district office nearest you.

Unvarying size, tensile and surface of Johnson Steel's .084 music wire meets Mid-West Spring's demands for coiling this windshield wiper spring.

Fatigue test measures endurance of wiper spring. Here spring records its 2,800,000th stroke with no sign of load loss.

Coilability counts in making this thermostat control spring, which is tested and sorted electronically on coiler. Adjustable-screw plug is threaded in spring, made of Johnson's .058 music wire.

Tooling, production skill, close control of quality and reliance on Johnson Steel's music wire for 31 years enable Mid-West to take difficult jobs in stride.

"Johnson Steel is the only manufacturer who can provide us with a full range of music wire, plus oil tempered and variously coated as well as bright, hard drawn spring wires we require," says James J. Dunne, purchasing agent and assistant sales manager. "The large stock in their Chicago warehouse is a distinct advantage, especially when we are pressed for fast delivery."

Mid-West is a leading producer of precision-engineered springs—some

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

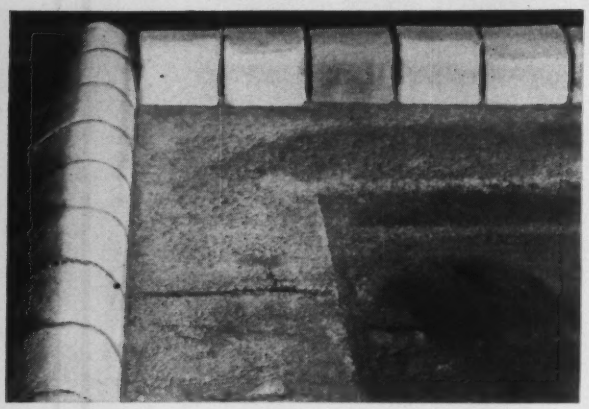
a subsidiary of **Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio

B&W Kaocrete-D, vibrated in place, provides high resistance to the atmospheres encountered in this coke oven door installation. Furthermore, the high erosion resistance and long service life without loss of strength of B&W Kaocrete-D add to its suitability in this application.



A typical monolithic curb wall construction in an annealing furnace using a carbon monoxide atmosphere. The greatly reduced number of joints in which sealing sand can penetrate prevents structural spalling of B&W Kaocrete-A upon heating and cooling. Being monolithic, gas leaks are practically eliminated.

A radiant tube annealing furnace with a base of Kaocrete-A, backed up with Kaolite-20, one of B&W's insulating refractory castables. This furnace operates at approximately 1700 F in a 65% CO atmosphere.

A stack annealing furnace with pedestals cast of B&W Kaocrete-A. The atmosphere is slightly above 8% CO. B&W Kaocrete-A offers strength, volume stability and resistance to carbon monoxide disintegration.

How B&W refractory castables perform in atmosphere applications

One of the difficult problems facing furnace builders and operators in the metals industries is the effect of atmospheres on refractory linings. That's why B&W offers several *specialized* refractory castables for this service, each possessing strength, volume stability and the refractoriness necessary to assure long, trouble-free service.

Take B&W Kaocrete-A, for example. Because of the careful selection and processing of special aggregates and other ingredients with low iron content, this material resists disintegration or other effects produced by high concentrations of CO or H_2 atmospheres. B&W Kaocast and Kaocrete-32 provide the same excellent service at higher temperatures while lightweight Kaolite-20 is outstanding as an insulating castable in atmosphere applications.

B&W Bulletin R-35A gives additional information on versatile B&W refractory castables. Write for your copy of this bulletin to The Babcock & Wilcox Company, 161 East 42nd Street, New York 17, N. Y.

R632

B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.

SPEED UP
materials movement
REDUCE
your handling costs
BOOST
overall handling efficiency

do it with a UNIT MOBILE CRANE

With materials movement taking a bigger percentage of the production dollar every day and building costs still increasing, thousands of modern manufacturing plants are turning to low cost outdoor space for storage. New protective wrappings, coatings, and sprays make outside storage possible; UNIT Mobile Cranes, offering you all these "yard-proved" features, make it practical.

- **Self-propelled** and mounted on rubber, a UNIT Mobile Crane can service widely scattered storage areas.
- **Hydraulic steering,** air brakes, and an air-actuated transmission enable the crane to get in and out of tight quarters with little effort.
- **ONE MAN control** for all crane operations, plus travel and steering, from the operator's cab.
- **Short turning radius** and full 360° swing assure tight-area working ease.
- **Full Vision Cab** permits operator to see in **all** directions . . . promotes safety . . . increases efficiency.
- **Disc-type clutches** provide uniform, positive engagement . . . loads are picked up smoothly and evenly.
- **Powered Boom** .. Power raised and controlled lowering of the boom means safe, precise load handling.

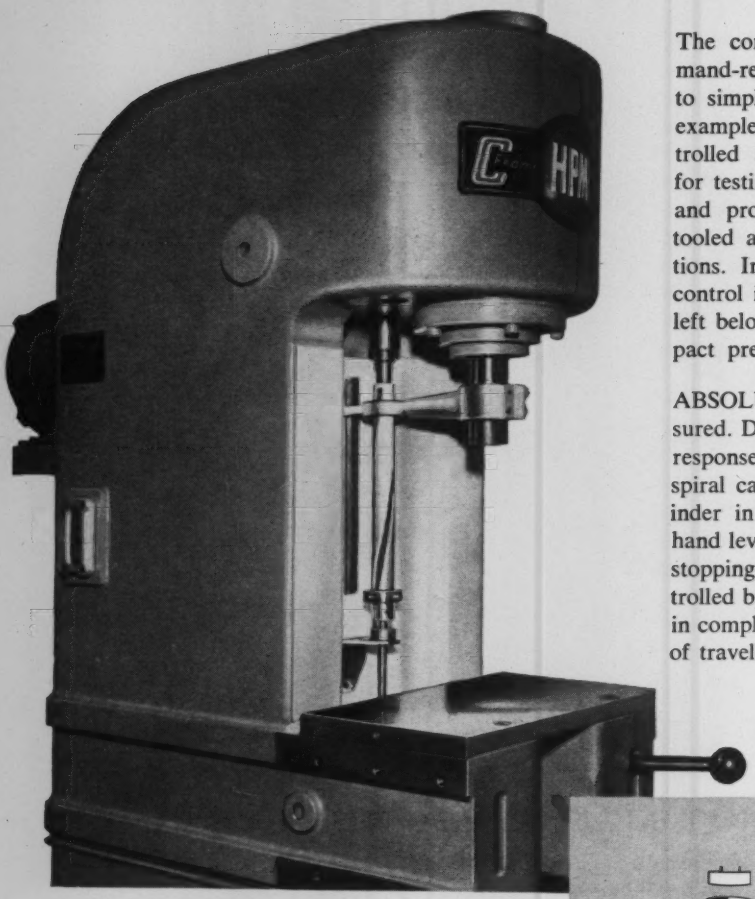
UNIT *Mobile Cranes are available in two sizes — the 15-ton Model 357 and the 20-ton Model 1520T. Plus, a complete line of crawler and truck cranes. Your UNIT dealer has complete information — call him soon.*

UNIT

UNIT CRANE & SHOVEL CORP.

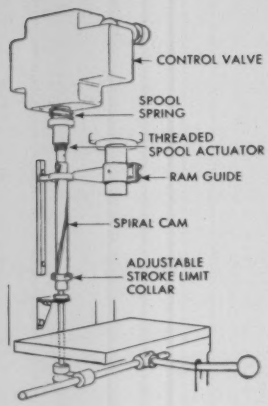
6517 W. Burnham St., Milwaukee 19, Wisconsin

SERVO CONTROLLED C-PRESS
LOW-COST GENERAL PURPOSE UNIT



The control possibilities of the H-P-M "demand-response" servo press offer many ways to simplify procedures and reduce costs. For example, the instant-response manually controlled action means unlimited opportunities for testing and analyzing all types of materials and processes. The press is compact, easily tooled and adaptable to a variety of applications. Initial cost is low; a single hand lever control is simple and foolproof. The sketch at left below illustrates the principle of this compact press.

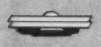
ABSOLUTE CONTROL of ram motion is assured. Direct relationship between demand and response is accomplished through a unique spiral cam principle that meters oil to the cylinder in direct response to the action of the hand lever. Speed of motion, tonnage, starting, stopping and repeat strokes are simply controlled by the single hand lever. The operator is in complete command of applied force, the rate of travel and the starting and stopping cycles.



The compact, new H-P-M C-Press Servo Feed Back Control fits neatly in the throat of the press—out of the way—no adjustments or linkages in the tooling area.

IDEAL FOR LAB WORK

Metal Ductility, Tensile Strength, Compression and **Drawing Characteristics** are typical test applications. Ample space for tools and fixtures, long adjustable stroke and complete hydraulic action are measurable benefits with this versatile machine.



Assembly Operations including staking, crimping, riveting and force fits may be predetermined in the lab ahead of actual tooling and production set-up. The **Compacting** of loose or granular materials are typical lab jobs to determine compaction characteristics.

Apply the versatile H-P-M C-Press to your most demanding requirements and when you're through with it, put it to work on the production line. It will fit any job in the plant with hydraulically controlled, manually operated press efficiency. Sizes 5-ton to 15-ton; other sizes and capacities to your specific requirements.

THE HYDRAULIC PRESS MANUFACTURING COMPANY
A Division of Koehring Company • Mount Gilead, Ohio, U.S.A.

HPM H16

HOW TO COPE WITH A COUPLER

At National Malleable & Steel Castings Co., Acme Idea Man Gene Fairbank views Idea No. U6-36 which he helped develop.

These AAR Standard E-60 couplers used to be a king-size shipping problem. Previously, they were loaded singly, by overhead crane, in gondola cars—unloaded painstakingly the same way.

Now, with Acme Steel Strapping, couplers are palletized in lots of six. Loading and unloading are faster, and easier. Storage is simpler, requires less space. Inventory problems have been eased.

There's a good chance that Acme Steel Strapping can profitably solve a materials handling challenge for you. Let your experienced Acme Idea Man study your problem. Or, for more facts, mail the coupon.

ACME STEEL

IDEA LEADER IN

STRAPPING

ACME STEEL COMPANY
Acme Steel Products Division
Dept. IFS-40
135th St. & Perry Ave.,
Chicago 27, Ill.

Please send me Idea No. U6-36 and examples of how major companies in my field use Acme Steel Strapping.

*Name*_____

*Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

Ed Weiner, president, talks with Ed Lebowitz, right, Chesterfield's superintendent, by one of the firm's three Wean Equipment slitting lines.

Chesterfield Steel relies on speed, accuracy, durability of Wean coil processing lines

Fast delivery—when, where, and how the customer wants it—is the metal warehouse's stock-in-trade. And Ed Weiner, president of Cleveland's Chesterfield Steel Service Co., is proud of the firm's record for on-time, "on-spec" deliveries of strip and sheet steel, nonferrous and coated metals.

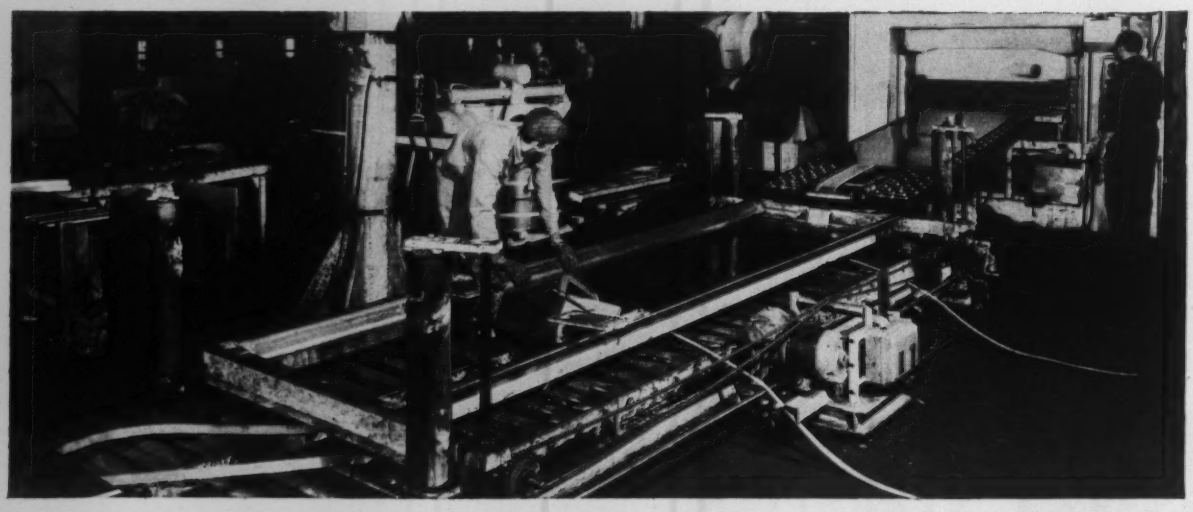
To maintain this reputation for service, Chesterfield needs equipment that will maintain its accuracy under tough, 3-shift, week-long operation. That's why this progressive firm has installed three Wean slitting lines and the 52″ Wean flying shear line shown below . . . and is ordering another flying shear line for 60″ wide strip. Most of the firm's orders for sheet material pass through this coil processing equipment, making both speed and reliability of operation vital. Mr. Weiner notes that the Wean 52″ flying shear line has doubled sheet production over other types of lines previously used by Chesterfield.

Like Chesterfield, Wean has established a reputation as one of the most knowledgeable firms in the field of coil processing and has built equipment that is now serving many of the country's largest metalworking firms. Write for a brochure covering the important savings *you* can realize from coil processing.

WEAN EQUIPMENT CORPORATION
22800 Lakeland Boulevard
CLEVELAND 17, OHIO

WEAN

Wean flying shear line has elevating run-out conveyor and side guides which adapt to pack height.



The alternate to this is . . . DOWNTIME!

An ounce of prevention . . . can eliminate *downtime* in your plant. With today's highly mechanized manufacturing and distribution methods . . . *downtime* of materials handling equipment can mean the difference between a profit or a loss.

A Clark Dealer *Continuous* Maintenance Program, available from 113 Clark dealers across the continent, offers you the most effective, and economical method of reducing costly *downtime*. Here's why!

In brief, a Clark Dealer Continuous Maintenance Program offers you:

1) . . . regular maintenance on your industrial trucks on a *programmed* basis. Scheduling is conveniently set up for your particular operation. If you like, service to your equipment can be done at night or at any other time when your equipment is not in use. The additional cost for this off-shift service is a small percentage of the cost of *downtime*.

2) Clark dealers, with the aid of a national service personnel training program, assure you that the best trained mechanics in the industry will service your equipment. These highly trained specialists perform a minimum of 22 separate inspections on every truck serviced. They not only perform the normal jobs of greasing and oil changes, but also make all necessary adjustments to your equipment. Most important, they report the condition of your machines, anticipating failure before it happens. As a result . . . *downtime* is drastically reduced.

3) A Clark Dealer Continuous Maintenance Program gets you out of the repair and maintenance business. It eliminates the need for special tools, parts stock and use of valuable plant space for servicing facilities.

4) A Clark Dealer Continuous Maintenance Program is economical. It actually costs less than similar service on your own automobile. This is an inadequate comparison, however, when you consider the small cost of preventive type maintenance to the cost of *downtime*.

For detailed information on a Clark C.M. program call your local Clark dealer (he's listed in the Yellow pages) or write: C.M. Service, Clark Equipment Company, Battle Creek, Michigan. No obligation, of course.

CLARK® EQUIPMENT

Printed in U. S. A.

CHEMICAL USERS' GUIDE

To General Chemical Products for the Metal Industries

Product	Available Forms	Commercial Strengths	Shipping Containers	Applications.
Sulfuric Acid H_2SO_4 + Water	Liquid	66° Be (93.2% H_2SO_4)	Carboys Drums Tank Trucks Tank Cars	Pickling and descaling; electroplating; bright dipping; electrolytic polishing; galvanizing; anodizing.
Hydrochloric Acid HCl + Water *(Muriatic Acid)*	Liquid	18°, 20°, 22° Be (27.4% to 34.1% HCl)	Carboys Tank Trucks Tank Cars	Pickling; electroplating; bright dipping; galvanizing; tinning; etching metals; dissolving metals.
Nitric Acid HNO_3 + Water	Liquid	42° Be (67.2% HNO_3)	Carboys Drums Tank Cars Tank Trucks	Pickling; electroplating; bright dipping; oxide finishing; dissolving and stripping metals.
Hydrofluoric Acid HF + Water	Liquid	70% HF	Drums Tank Cars	Pickling; electroplating; electrolytic polishing; bright dipping.
Sodium Fluoride NaF	White Powder	98% NaF	Bags Fibre Drums	Manufacture of rimmed steel; heat treating; galvanizing; pickling; electroplating.
Sodium Bifluoride $NaHF_2$	White Powder	98% $NaHF_2$	Fibre Drums	Electroplating.
Sodium Silicofluoride Na_2SiF_6 *(Sodium Fluosilicate)*	White Powder	98% Na_2SiF_6	Bags Fibre Drums	Electroplating.
Trisodium Phosphate $Na_3PO_4 \cdot 12H_2O$ *(TSP)*	Crystal	18.4% P_2O_5	Bags Fibre Drums	Alkali cleaning.
Sodium Metasilicate, Crystal $Na_2SiO_3 \cdot 5H_2O$	White Granules Powder	29.2% Na_2O	Bags Fibre Drums	Alkali cleaning.
Sodium Metasilicate, Anhyd. Na_2SiO_3	White Granules Powder	50.5% Na_2O	Bags Fibre Drums	Alkali cleaning.
Oxalic Acid $C_2H_2O_4 \cdot 2H_2O$	Colorless Crystals	99.5% $C_2H_2O_4 \cdot 2H_2O$	Bags Fibre Drums	Oxide finishing; metal cleaning.
Potassium Fluoborate KBF_4	White Powder	98.5% KBF_4	Fibre Drums	Aluminum and magnesium casting; as a flux and grain refiner for aluminum; for removing magnesium from secondary aluminum alloys.
Sodium Fluoborate $NaBF_4$	White Powder	95.0% $NaBF_4$	Fibre Drums	
Ammonium Fluoborate NH_4BF_4	White Powder	97.0% NH_4BF_4	Fibre Drums	Aluminum and magnesium casting; electroplating.
Fluoboric Acid HBF_4 + Water	Liquid	48.0% HBF_4	Carboys	Electroplating; metal cleaning or dipping.
Lead Fluoborate $Pb(BF_4)_2$ + Water	Liquid	50.0% $Pb(BF_4)_2$	Carboys	Electroplating.
Nickel Fluoborate $Ni(BF_4)_2$ + Water	Liquid	44.0% $Ni(BF_4)_2$	Carboys	Electroplating.
Tin Fluoborate $Sn(BF_4)_2$ + Water	Liquid	47.0% $Sn(BF_4)_2$	Carboys	Electroplating.
Zinc Fluoborate $Zn(BF_4)_2$ + Water	Liquid	40.0% $Zn(BF_4)_2$	Carboys	Electroplating; bonderizing aluminum.
Copper Fluoborate $Cu(BF_4)_2$ + Water	Liquid	45.0% $Cu(BF_4)_2$	Carboys	Electroplating.

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.

Basic to America's Progress

Allied Chemical

OTHER PRODUCTS: Acetic Acid; Ammonium Thiosulfate Solution; Aqua Ammonia; Barium Fluoride; Chromium Fluoride; Copper Fluoride; Copper Sulfate; Sodium Sulfate (Anhydrous); Iron Sulfide; Nickel Fluoride; Perchloric Acid; Sodium Bisulfite, Anhy.; Sodium Silicate; Sodium Sulfite, Anhyd.; Stannous Chloride; Sulfur; Tetrasodium Pyrophosphate; Sodium Tripolyphosphate; Potassium Titanium Fluoride.

FOR THE LABORATORY OR SPECIAL APPLICATIONS: BAKER & ADAMSON® REAGENTS and FINE CHEMICALS

GENERAL CHEMICAL DIVISION

40 Rector Street, New York 6, N. Y.

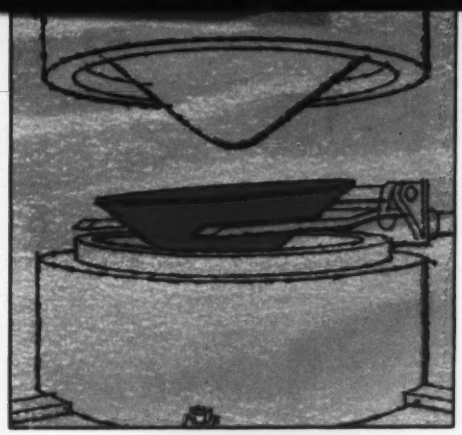
New rear dump hauls 15% more payload — *built entirely from USS "T-1" Steel.* This Athey PR 619 T-line trailer hauls 25 tons but weighs only 19,260 pounds. One man can move more tons of material, less fuel is consumed when running empty, and the machine has a faster cycle. The big improvement in performance starts with the use of USS "T-1" Steel *throughout.* This "strong boy" of metals cuts dead weight, substitutes 15% extra payload. Tougher, it defies relentless abuse, adds life. USS "T-1" Constructional Alloy Steel has a minimum yield strength of 100,000 psi. It is weldable and has high resistance to impact abrasion and corrosion. What's more, it retains its toughness at temperatures even down to 50 below zero. This combination of properties permits design for maximum weight savings coupled with ability to take abuse. In addition to "T-1" Steel, United States Steel makes other brands of steels for a wide variety of applications: USS COR-TEN, USS MAN-TEN and USS TRI-TEN with a 50,000 psi minimum yield point, in addition to a complete range of carbon and stainless steels.

USS, "T-1", COR-TEN, MAN-TEN and TRI-TEN are registered trademarks

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
National Tube—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

USS



Nose cone being removed from Wyman-Gordon-U.S.A.F. forging press.

Precision Forging of ATLAS Nose Cones

Inspection of copper nose cones at Wyman-Gordon-U.S.A.F. Plant.

When you need a large, custom-engineered die block, think of U. S. Steel first. Take this 40-ton die block shown in the final stage of forging on our 10,000-ton press. Designed by Wyman-Gordon for production of copper nose cones by closed die forging, this job received the personal attention of our metallurgists, forgers, and machinists from start to finish.

To obtain the correct hardness, our metallurgists chose a CrMoV alloy. An 85-ton electric furnace heat was then "vacuum-cast" into a 72″ diameter ingot to produce the best internal quality possible. Under the careful supervision of our forge team, the ingot rapidly assumed the final contours. As you can see, the die impression was "forged-in" with a special cupping tool for maximum toughness.

This die block was then subjected to a series of heat treatments and machining operations, closely coordinated between heat-treater and machinist, to produce maximum performance at the Wyman-Gordon-U.S.A.F. Plant. Final inspection of the rough machined block included hardness and ultrasonic testing as well as a close check of dimensions.

In addition to large die blocks such as this one, U. S. Steel makes many types of forgings—all by a team of experts. Let them handle your next order. You'll be assured of a high quality product, specifically engineered for your particular application.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

Here is one of a fleet of forty Type 430 Stainless Steel tank cars that transport nitric acid. Built in 1956 by General American Transportation Corporation, these tank cars are still in excellent condition.

Leading the pure life—in USS Stainless Steel

A manufacturer's *second* biggest disappointment is to have his product rejected because it was contaminated during shipment. The *biggest* disappointment comes when the customer buys his next order from someone else.

Manufacturers who ship or contain their products in Stainless Steel seldom worry about product purity. Many chemicals that eat away other metals have no effect on Stainless Steel. It keeps a smooth, dense surface that is easy to clean. No corrosion. No pits. No place for dirt to hide. And there's less danger of spoiling one batch with residue from another.

Because Stainless Steel is so strong, it can be used in thinner, lighter gages—reducing the overall weight of the container. But the real clincher is this: even though Stainless Steel costs more, there is no cheaper material in the long run. Specify USS Stainless Steel . . . through our nearest sales office or your local Steel Service Center.

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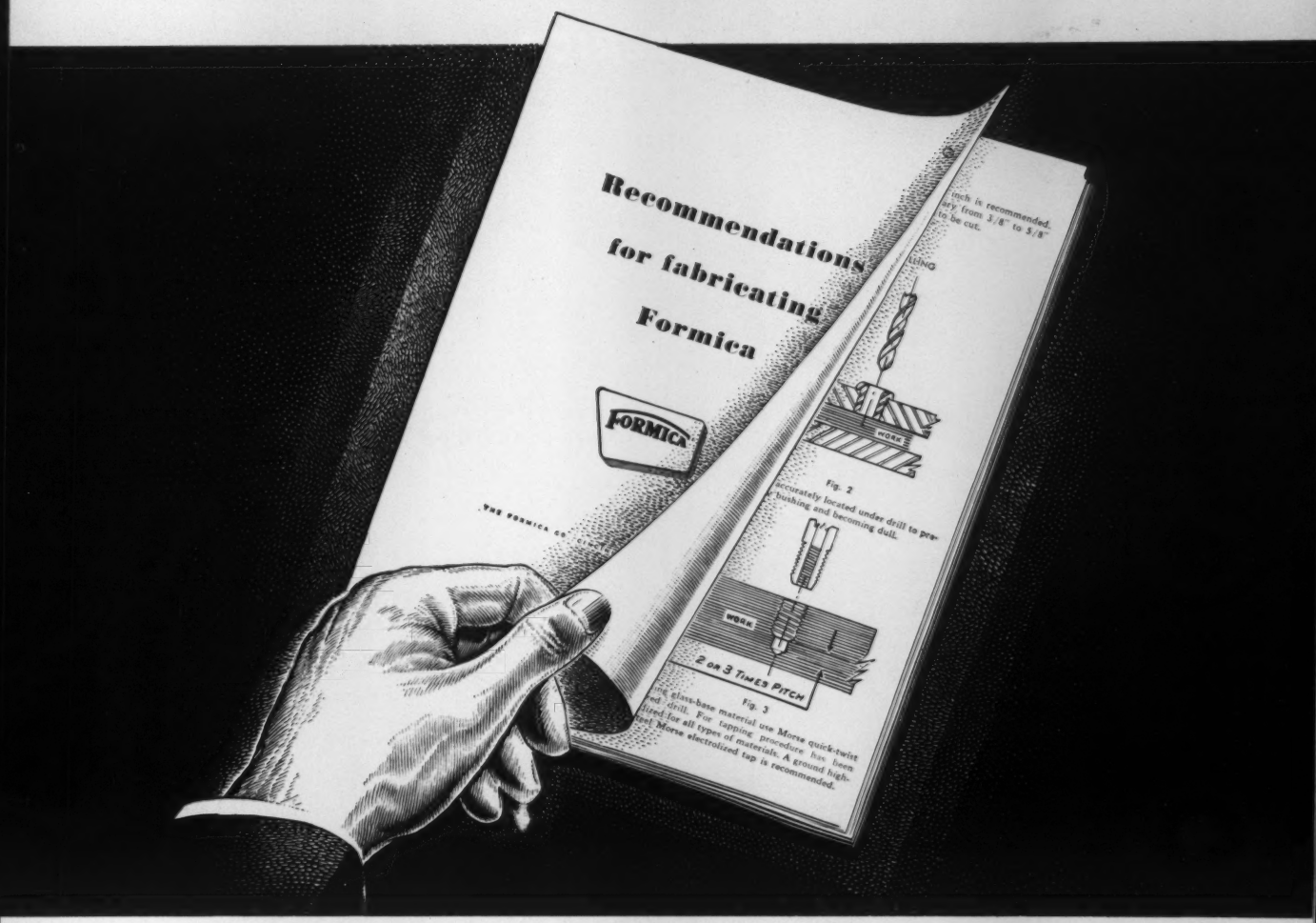
United States Steel Corporation – Pittsburgh
American Steel & Wire – Cleveland
National Tube – Pittsburgh
Columbia-Geneva Steel – San Francisco
Tennessee Coal & Iron – Fairfield, Alabama
United States Steel Supply – Steel Service Centers
United States Steel Export Company

USS United States Steel

FORMICA SPECIFIES MORSE TOOLS



Morse Electrolized Tools proved best by test for tapping – drilling glass, fabric and paper – base materials.

Formica pulls no punches in its installation manual . . . they recommend Morse. Why? Because they proved Morse Electrolized Taps and Drills *best* by test for installing their material.

Prove to yourself what Formica and other manufacturers have found . . . the exclusive Morse *Electrolizing* Process gives up to 30% longer tool life on the toughest jobs – no matter what base materials are used, there is a Morse Tool designed to help you cut production costs . . . build a better product.

See your Morse-Franchised Distributor. He is the *only* man to see when you want the best in cutting tools. Call him *today*.

MORSE

means "THE MOST" *in Cutting Tools*

MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASSACHUSETTS

Warehouses in: NEW YORK • CHICAGO • DETROIT • DALLAS • SAN FRANCISCO

Morse means more production . . . smoother, more accurate production . . . with every type of cutting tool from drills, reamers, taps and dies, to end mills, milling cutters, slitting saws and "specials". So, if you want the best from every cutting tool you buy, mark your order "MORSE". For if you want *Morse Quality*, there's only one way to get it . . . *specify Morse.*

VN

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ALL ACROSS AMERICA . . .

More Steel Service Centers than ever stock BLISS & LAUGHLIN cold finished steel bars

This fact means superior service when you specify Bliss & Laughlin cold finished steel bars, for two reasons:

1. Bliss & Laughlin has the *most complete* and *most flexible* mill service in the industry.
2. Because more Steel Service Centers than ever stock Bliss & Laughlin bars, every metalworking plant can now get especially fast *local* service.

Analyze your "cost of possession" of cold finished steel bars. Perhaps you'll see, too, why so many buyers depend more and more on their Steel Service Centers to help them lower "cost of possession" expenses.

Talk over your cold finished steel bar requirements with your Steel Service Center. Those stocking Bliss & Laughlin bars will give you *outstanding* service (we know, because we've seen them in action!).

THE BLISS & LAUGHLIN LINE

Cold Finished Steel Bars In Carbon, Alloy, Leaded Carbon and Leaded Alloy Grades

LUSTERIZED® COLD DRAWN
COLD DRAWN, GROUND AND POLISHED
TURNED AND POLISHED
TURNED, GROUND AND POLISHED
STRAIN-TEMPERED® CARBON BARS
SPECIAL PROCESSED ALLOY BARS

Complete Facilities for Furnace Treatment
All Popular Shapes and Sizes

Specialists in Finish, Accuracy, Straightness, Strength and Machinability

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • MILLS: Harvey, Detroit, Buffalo, Los Angeles, Seattle, Mansfield, Mass.

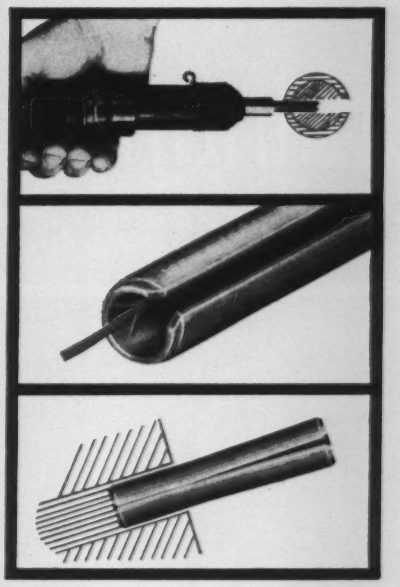
Leading Independent Producer of Cold Finished Steel Bars

Rollpin won't mushroom or telescope

There are no installation or removal problems with Rollpins. Because of their column strength they can be readily driven with a hammer, removed with a punch without bending or collapsing. Of course production line tooling such as an arbor press, a pneumatic hammer . . . even a hand riveter . . . is ideal for Rollpin insertion.

Rollpin won't damage or enlarge hole

With smoothly chamfered ends providing an easy lead-in, Rollpin is compressed into complete conformity with the shape of the hole. The exclusive, v-shaped, coped corner design eliminates possibility of damage to the hole walls. They prevent any possible scoring action as the pin is driven and insures uniform insertion and removal characteristics. The benefit to you: the same pin can be reused in the same hole.

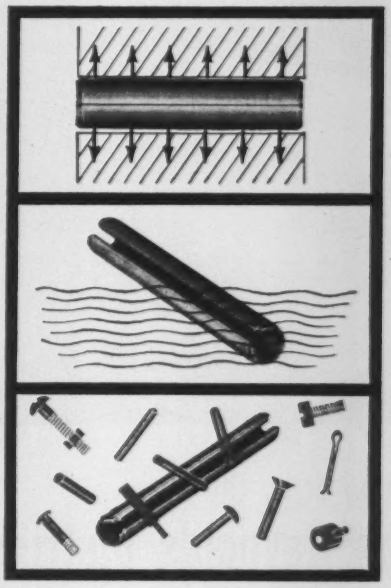


ONLY ROLLPIN OVERCOMES ALL THESE FASTENING PROBLEMS!

Rollpin exerts EVEN pressure

In some fasteners, only a portion of the fastener shaft does the actual holding. Rollpin, however, exerts a uniform pressure around the entire inside surface of the hole—giving you maximum holding power and superior resistance to vibration.

Split tubular construction assures uniformity of heat treatment that is difficult to obtain with spiral types of pins; there is an even plating "throw" inside the pin as well as outside for superior corrosion protection.



ONE TYPE of Rollpin does EVERY TYPE of job

Versatile Rollpins will replace at least 12 different types of fasteners. Every Rollpin can be hopper-fed, can be installed with a single operation. They are available, from stock, in a wide range of lengths and in diameters from 1/16" to 1/2". Manufactured from carbon or corrosion resistant steels and beryllium copper.

ROLLPIN®

ELASTIC STOP NUT CORPORATION OF AMERICA

WHERE CAN YOU USE THIS VERSATILE FASTENER? MAIL COUPON FOR SAMPLES:

Dept. R59-477, Elastic Stop Nut Corporation of America
2330 Vauxhall Road
Union, New Jersey

☐ Please send me ROLLPIN samples
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...or practically any aluminum mill product

by the pound or by the ton

from the Reynolds Distributor

Why tie up money and space in a big inventory of aluminum mill products? Get all the aluminum you need—as you need it—from the nearby Reynolds Distributor. Chances are, he stocks just the type, size, and alloy you want—and he can get it to you *fast*. His specially-trained men can give you cost-cutting technical help. You get *more* than metal from the Reynolds Distributor. *Reynolds Metals Company, P.O. Box 2346-DH, Richmond 18, Virginia.*

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Watch Reynolds TV shows:
"ADVENTURES IN PARADISE",
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"ALL STAR GOLF"—ABC-TV

For the name of the nearest Reynolds Distributor, look under "Aluminum" in your classified phone book

PRESSURE ON PRICE LEVELS IS MOUNTING throughout metalworking. Most vulnerable are nonferrous metals and mill products, which have dropped in recent days. Forgings, castings and stampings are feeling the strains of tense competition. Most frequently blamed factor: Low cost imports. (P. 105)

INCREASED CARLOADINGS are forecast for the second quarter in electric appliances and scrap. National Association of Shippers Advisory Boards sees appliances up 10.6 pct; scrap up 7.4 pct.

SELL YOUR COMPANY AS WELL AS YOUR PRODUCT is sign in the sky as General Electric launches new value approach to industrial buying. Buyers must perfect techniques to evaluate "added values" such as vendor quality control, application engineering, and after-sale service. Coming from the pioneer company in product value analysis, a technique of wide impact on purchasing, this new concept may bear watching.

1961 AUTO MODELS being readied by Detroit presage shorter, slimmer, lighter cars. Sheet metal alterations will be minor except in a few cases. Rear deck area and rear fenders are main targets of the designers. (P. 121)

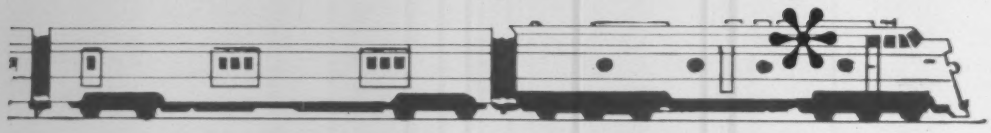
CAPITAL GOODS MAKERS will probably need to overhaul their marketing methods for the tougher selling of the 1960's. Sales promotion techniques must be adjusted to demands for both foreign and domestic markets, leading economist says. Two needs: More knowledge of overseas markets; greater emphasis on selling specialized engineering knowledge.

MISSILE EMPLOYMENT IS UP 60 pct in last two years, says Labor Department. Heaviest concentration of missile work is in the Los Angeles-Long Beach area (25 pct of nation's missile men).

CONSTRUCTION WAS TOP STEEL USER last year according to the IRON AGE analysis of finished steel shipments reported by AISI. Builders, taking 25.1 pct of direct mill and service center shipments, nosed out automakers (22.5 pct) by a slight margin.

ONE BIG REASON FOR SLUGGISH INVENTORY BUILDUP is closer stock controls by industrial buyers. Improved buying and inventory techniques have pushed inventories further back from ultimate consumers.

The Park Forging* that works as hard as this one has got to be good!



Better than 60% of all the diesel locomotives in the world are equipped with Park die-forged crankshafts.

It will pay you to find out how and why a Park Preferred Forging can exceed the usual.

Call us for some interesting and important answers.

the park drop forge co.

779 East 79th St., Cleveland 3, Ohio

pf

Metalworking Prices Falter As Competition Toughens

List price is no longer the rule in many metalworking markets. Price cuts aren't general, but they do exist.

Reasons are domestic competition, low-priced imports, and tighter purchasing practices.

■ There is strong pressure on prices throughout metalworking. Many prices of basic materials and components are holding, may even go up. But many others are soft and are being discounted regularly.

A scattered number of price cuts in parts and materials have occurred in recent days: Warehouse discounts restored for stainless steel, reductions in some brass mill prices, steel warehouse cuts in local markets, to name a few.

Fringe Weaknesses—These don't necessarily mean general price weakness. But competitive pressures are mounting and the result is a weakening around the fringes and a few definite breaks.

The spotty nature of price action and the informal nature of the cuts make a broad appraisal difficult. There have been few sharp changes in any price indexes (see chart). And throughout the metalworking industry, talk of price increases is as frequent as talk of price cuts.

The Evidence—Nevertheless, evidence of price weakness continues to build up.

For one large steel company, prices of purchased products dropped 1.5 pct in the first quarter. A further decline is predicted in the second quarter. For an electrical manufacturer, prices have risen three-fourths of one pct since October, but are "not going either way" at the moment.

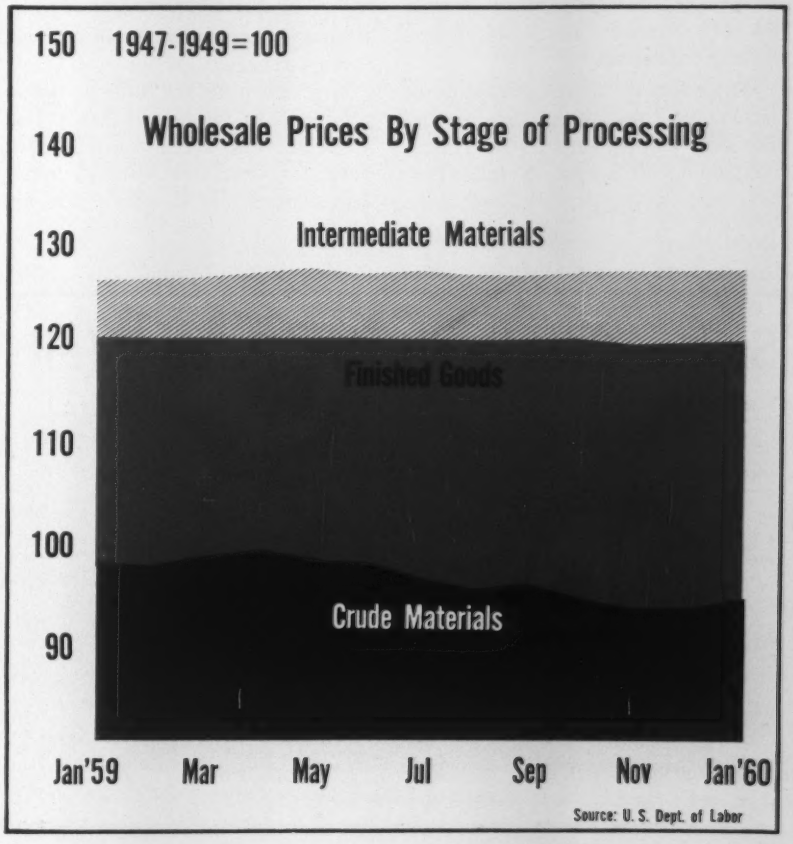
Pressure on prices is coming from three sources: Domestic competition, sharper purchasing, and import competition.

Imports Hurt—Of the three, import competition is getting the largest share of the blame. There are few metalworking products today that aren't beset by lower priced imports. And, it's always easier to blame imports than either of the other two factors.

Aluminum and copper and copper products appear to be in the toughest price position. A major producer calls aluminum prices fluid, says, "We're meeting price competition where we find it. And sometimes we don't find it until too late."

In Aluminum — Among alumi-

Pressures Steady Prices



num products, extrusions and sheets are showing the greatest price weakness. The extrusion situation is not new. But light gage sheets are another product where discounting now occurs.

Aluminum imports are also underselling U. S. producers. Discounts on aluminum imports are not large, but they are rigid. But, imported aluminum is not now considered a major factor in domestic markets. Domestic competition is the big factor.

"The aluminum industry is running scared," the sales head of a specialty warehouse told The IRON AGE.

Too Much Cutting?—He feels the competitive scramble has produced price slashing that is unsound and often unnecessary. Quantity concessions by smaller producers are cited. A mill will price an order on the basis of a large quantity, say 50,000 lb. Then, shipments will be made in smaller lots and spread over a period of time. Commodity prices and special prices for trial orders are also cited as unsettling influences.

The effect of foreign competition shows up strongly in the copper situation. Copper imports have been running 4¢ to 8¢ per lb under the domestic level. Brass tubing has been coming in from several West Europe countries.

Copper Cuts—Last week, domestic mills moved to meet the threat. A round of cuts dropped hot-rolled and cold-rolled copper sheet by 7¢ per lb. At least one brass mill has reduced prices of five sizes of copper water tubing as well as copper sheet. Both sheet and tubing reductions apply to prices for distributors. Suggested resale prices have not been changed.

Also last week in the Pacific Northwest, discounts on steel bars and structurals were announced. It's estimated that the discounts amount to a price cut of roughly 10 pct of the old price. Indications are the cuts were made to meet foreign competition. Even then, the cuts won't match import prices.

Stainless Falters—On steel, mill prices on carbon steel are holding firm. Stainless steel prices are a different story. Mill discounts to warehouses on stainless plates were recently raised from 5 pct to 10 pct. There are persistent reports of price trimming on other products, although relatively minor.

But steel mills are getting pointed reminders of the import threat. For example, one large manufacturer says it is not using foreign steel, but reminds his suppliers that his competitors are. This, he points out, leaves his company in an unfavorable cost position.

Spot Reports—Here are some spot reports on prices, some with a regional nature:

Stampers continue to admit that pricing is "very competitive." Some price increases (about 4 to 6 pct) that occurred in the fourth quarter of 1959 have been wiped out by subsequent price cuts.

It's still common to quote a "production run" price on a short run order. This amounts to price shaving, but, like most of the price cuts today, it's hard to pin down. In addition, stampers have been providing rush delivery in some areas without additional charge, or providing material storage for their customers "on the house."

Foundries Vary—In the Cleveland area, with its heavy concentration of foundries, there is some softness on new price quotations. Buyers prefer to put it that the increase in prices has slowed, rather than any out-and-out price cutting. This always goes on in foundry work in normal times.

Buyers generally know where they can get a lower price on certain items, but must balance it against quality, delivery and other considerations. These are used for market leverage.

Here's a typical reaction of one castings buyer for an electric motor company:

Inflation Slowed—"We are currently re-designing some of our sizes of electric motors and have been pleasantly surprised to find the inflationary trend has died down compared to prices quoted six months ago.

"We don't switch around too much, but if we sent out patterns and drawings all over the country for bids, we would get much more competitive prices than six months ago."

Some Increases—In Chicago, for two years foundrymen have argued

Some Cracks in the Price Wall

Foreign Ore
A 2 pct drop in the first quarter.

Ferroalloys
First quarter reductions.

Large Motors
10 pct under last year; 20 pct under book price.

Machinery
No change.

Stainless Steel
Plate discount to warehouse increased to 10 pct.

Copper
Sheet prices down 7¢ per lb.

Semiconductors
5 to 15 pct reduction.

Aluminum
No official changes; prices fluid and competitive.

Castings
Some softness on price quotations.

Secondary Sheet Steel
"Make an offer."

they were selling on quality, not price. But there was price shaving, either in freight absorption or failure to advance prices when wage settlements pushed up operating costs. In recent months, however, some foundries have boosted prices and made them stick. And many talk about higher prices in May, using labor settlements as talking point.

One area where prices are firm is the tool and die business. Cut-rate selling began to disappear in December when new orders came in and backlogs developed.

P. A.'s Alert — The general sharpening of competition has not been lost on purchasing agents. And some suppliers believe bargaining tactics are going beyond the usual bounds of a normal buyers' market.

"There's no such thing as a standard price anymore," says one. "Now, there's haggling on everything."

But a top purchasing man in steel puts it a little differently.

"I don't like to use the word 'dickering,' " he says. "We do dicker, of course, but more important, we're looking for purchasing methods that will lower the costs of the supplier and prices paid by us. We're exploring every avenue in this direction."

He points out that the purchasing function has undergone a general upgrading in recent years. Purchasing men are better trained and have developed new techniques.

One technique used by purchasing men that has a price depression result is the blanket order. In this case a quantity discount is obtained on the basis of placement of an order for an annual requirement. But the purchasing man can often cut back deliveries against the order as his requirements may slide.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

BIRDSEYE VIEW: Inco's new Levack mill and sand plant, located in Ontario's rugged Sudbury area, makes extensive use of automation.

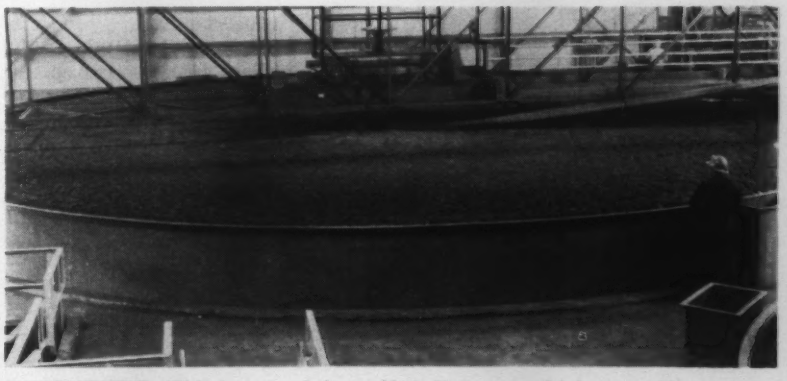
Automation Stressed At New Inco Mill

■ A highly-automated ore milling plant has been opened by The International Nickel Co. of Canada, Ltd., in the Sudbury area of Ontario.

Located at Inco's Levack Mine near Copper Cliff, Ont., the $12 million plant makes extensive use of instrumentation to permit, in some cases, automatic control of crushing, grinding, flotation and dewatering processes involved in producing ore concentrates.

Central Control—All operations are controlled from centrally located instrument panels. In one operation, crushers, crusher oil pumps, screens, variable speed ore feeders and conveyors are run and controlled from a panel. The device also controls the entire grinding operation. Flotation process variables such as pulp density, temperature and alkalinity are also automatically controlled.

The Levack mill has a capacity of 6000 tons of ore daily. With a new nickel mining project being developed at Thompson, Man., it will raise Inco's nickel production capacity to 385 million lb a year.



THICKENER: This is one of three 60 ft Dorr tray thickeners. Here nickel concentrate is dewatered after flotation at Inco's modern plant.

BIG YIELDS: Blast furnace yields from taconite pellets have sparked new interest by mills.

CRUSHER: Capacity at Reserve (giant crusher shown here) will be increased by 60 pct in new plans.

World Politics Push Taconite Use

Potential unrest in ore-rich countries causes steel producers to increase U.S. taconite investments.

Beneficiated low-grade ores won't halt advance of imports, but they will widen the base of ore sources.—By Tom Campbell.

■ Lake Superior iron ore people have stopped their rear guard action. They are now attacking directly.

That's the best way to sum up the vast strides in taconite advances. High cost at first, tough to improve, but now a prime product, what is the pitch on taconite now?

Lakes' Hope—Taconite or Jasper will never be the complete answer to the depletion of open pit Lake Superior ore. Nor will it slow down to any extent the inroads of foreign ore. But it has and will reawaken in the breasts of the Lake Superior areas the feeling that all is not lost.

More important, the expansion—such as the 60 pct expansion coming in Reserve Mining Co.'s activity—in taconite's potential points up the necessity for every steel company to have as many iron ore sources as are financially possible. This is a must. As the years go by, and as nationalism becomes more intensified in South America, Canada, Africa, Cuba and other nations, diversification of source will be a life saver.

Troubles Abroad — The totally unlooked for (so soon at any rate) tension and bitter outlook in South Africa is bound to leave its impact on other African nations now seeking self government stature. Bitter racial feelings may spill over into nations where the white and black man were making substantial progress—until the eruption in South Africa.

One major item in those nations is iron ore. Another is manganese. And there are many other basic minerals no longer plentiful in the Western hemisphere. Already, the tough test of universal sanity in racial relationships is clear for all Western nations to see. That is why a few leaders in the steel industry shift their feet uneasily in the privacy of their clubs in Cleveland, Pittsburgh, and New York.

But more than nationalism, low wage competition, and competition with superior imports has focused attention on taconite. Success far beyond what had been hoped for as in taconite resulted in new investments. Last week, for example, Reserve announced plans to inincrease capacity by 60 pct.

Republic Moves—A few years ago, Republic Steel Corp. had about a 25 pct ownership in Iron Ore Co. of Canada. It decided then that its other sources were good enough and big enough to relinquish some part of its IOCOC ownership. It sold about 10 pct of its 25 pct to Bethlehem Steel. This left it with about a 15 pct ownership.

Now, Republic sees endless success with pellets. And the celebrated battle between Republic and Armco's Reserve Mining and Mesabi Iron has been ended with back slaps and wide smiles. Republic

now has up for sale, privately, or will put up for sale soon, a third of its remaining 15 pct of Iron Ore Co. of Canada.

Imports Still Grow—Success and expansion of taconite and semi-taconite ores in the Lake Superior region will not stave off the declining importance of Lake Superior ore to total ore used in the U. S. Nor will the heyday of pellets mean a reversal or a sharp slowdown in foreign ore imports. But the stepup in use of concentrated U. S. ores means that what was once taken for granted — foreign inroads — is now being fought tooth and nail by Lake Superior-based companies.

Old line firms such as Cleveland Cliffs Iron Co., Pickands Mather & Co., and Oglebay, Norton & Co. have moved quickly to: (1) Upgrade their concentration of ores; (2) Improve structure and carry on exploration and refining of semi-taconite; and (3) Be part of and help operate foreign deals which will supplement their U. S.-based projects.

New Factors to Consider — In going in all directions at once, American steel firms and ore companies have come upon things they never paid too much attention to. In the past, an iron ore deal could be put through by price alone. There was a time when tonnage and price were the main ingredients of a long-term deal.

Too many fines, too low an Fe content, too damp an ore, too soft a structure, too long a haul and too risky a "republic" are a conglomeration of factors which worry ore people looking for long-term customers. Many of these things are being settled by pellets, sintering plants, close partnerships and re-arranging of "positions."

But the best thing American ore consumers seem to have learned—and learned well—is to have a multitude of sources while refining, researching and expanding the "at home" potentials. Even then, the demand for foreign ores by 1980 will be close to 50 pct of total ore receipts in the U. S.

Founders Battle Inventory Backup

Inventories are shifted back to sellers as new buying and inventory techniques minimize buyer stocks.

Still, buyers have complaints. Too much expediting needed, and suppliers don't educate buyers, malleable foundrymen are told.

■ If you've been wondering why the inventory buildup has been so sluggish this year, you may find part of the answer in some fairly new purchasing concepts. "Material management" is one. "Value Analysis" is another. Perhaps even more important are new ideas on paperwork and inventory control.

The impact of these relatively new concepts was outlined by Allis Chalmers' purchasing director, K. R. Geist, at a market development conference of the Malleable Founders Society last week in Chicago.

No Holds Barred—The malleable foundrymen are not singing the blues, but they wanted the facts from their customers. They are running at upwards of 65 to 80 pct of capacity. This is well ahead of last year, but below expectations.

Among those who explained and criticized was Mr. Geist. Why, for instance, didn't inventories snap back fully after the steel strike? This, perhaps more than anything else, knocked most "Soaring Sixties" predictions into a cocked hat.

What Happened?—First is the growing tendency to issue blanket orders for a year in advance. This permits a company, like Allis Chalmers, to revise schedules every month or so. And it gives a supplier a chance to plan ahead. But it may also leave the supplier with unshipped parts in stock; he carries the inventory instead of the consumer.

Since this seems to be going on at all levels, inventories are being pushed further back from the ultimate consumer. But closer controls permit them to be moved faster.

Manage Materials — Mr. Geist explained part of this new concept by noting that 10 pct of parts in stock might account for 90 pct of the total dollar value. If you put a lot of paperwork and accounting into the other 90 pct of the stock, you are wasting time over what amounts to little money. So you just about ignore these low-value items.

What Does It Do?—Value Analysis, a post war baby, means taking a functional approach to each part made or bought. You look, as Mr. Geist explained, at a phenolic insulator for a generator (cost $1.50) and ask what purpose it serves. The answer is that it insulates brushes from each other. So you end up by insulating the wires from each brush (cost 6¢ each) instead of using the big insulators.

Did he have any complaints to register? Yes, said Mr. Geist, he had a few—by no means restricted to the group he was addressing. No. 1 among them was across-the-board price increases. "Costs are not the same on all castings, regardless of size or shape; so I don't see why price increases should be uniform either."

"Expediteritis" — "Before the War we had 3 expediters at Allis Chalmers," said Mr. Geist. "Today we have 40. They add about 8 pct to our costs. We think salesmen should do this job; should be able to keep us informed on orders, follow through for us."

Some of the industries our suppliers represent don't do enough education; they don't tell us and our engineers enough about what their material can do, Mr. Geist noted.

Explanation: Controller, W. M. Webb (left), and assistant controller G. R. Krecker give facts to employees.

Alan Wood Tells Employees

Executive team explains annual report to supervisors and salaried employees.

Penetrating questions by employees reveal keen interest in program.

■ "Why didn't the company make its bonds available to the general public?"

"Because private placing of a fund of this size saves many thousands of dollars in registration fees and administrative expense. And, in our case we believed it allowed us to borrow the issue on terms which were more favorable to the company."

The question was answered by W. M. Webb, treasurer of Alan Wood Steel Co. And it concerned the company's recent financing of a $30 million expansion program.

But the occasion for the penetrating financial question was not the annual stockholders' meeting. It was asked by a salaried employee in a session of the company's communication program.

Two Way Flow — Alan Wood management believes its employees should not only be kept fully informed regarding company activities, but that they should be given opportunity to ask questions and voice opinions.

The annual report information meetings, at which the above question was asked, are an important part of the company employee communications program. Here's how these meetings worked this year:

The Plan — Three executives knowledgeable in company finances and operations, from March 15 to April 5, spoke daily to small groups of supervisors and salaried employees.

Timing of the meetings was immediately after release of the annual report to the stockholders.

Supplementing the talks by the three executives was use of specially prepared blown-up charts.

Wide open question-and-answer sessions followed each meeting.

The three executives were Mr. Webb, controller L. G. Campbell, and G. R. Krecker, assistant controller.

Procedure—The usual procedure was for Mr. Webb to start off with a detailed explanation of the facts behind the president's letter. Armed with blown-up charts, showing such statistics as sales and operating revenues, and 1959 ingot production as a pct of rated capacity, either Mr. Campbell or Mr. Krecker then took over to explain the details making up the report's financial pages.

At this year's meetings, Mr. Webb closed the presentations with an explanation of the background and significance of the company's $36 million capital expenditures.

Knowing Questions—Here are a couple of other questions that give indication of employee interests:

"Do we have the market for the output of the new mill?" (blooming and plate mill under construction).

Answer: (Krecker) "From our market studies conducted by our commercial research department, we know there is a market for the plate from the new mill. But, of course, it is up to our salesmen to develop the market."

The Payoff — Says Alan Wood president, H. R. Wood, on the meetings: "The interest shown in the program as evidenced by the depth of the questions asked has been most gratifying. In addition, from some employee comments, we realize the program has led to a much better understanding of the company and its financial operations."

New Pipelines Revive a Market

Famine Ends as FPC Approves Several Projects

Linepipe producers are stepping-up production now that the FPC has OK'd several new pipelines.

They have hopes that this is just the beginning of a good year.—By T. M. Rohan.

■ A Canadian permit to export natural gas is reviving U. S. producers of large transmission pipe. At Republic Steel Corp.'s Gadsden, Ala., plant, Bethlehem Steel Corp.'s Sparrows Point mill, and U. S. Steel Corp.'s National Tube Div. at McKeesport, Pa., pipe welding lines are being brought back into production. Some had been idle for six weeks or more.

Behind the rush of business was Federal Power Commission approval of a new pipeline for Midwestern Gas Transmission Corp. The line will run from the Canada-Minnesota border into the Chicago market. The line requires 700 miles of 24-in. pipe and supplements gas supplies coming from Texas.

Canadian Gas—Midwestern's new line and permits for two others could result in a group of new projects to bring Canadian gas to supplement Texas and Louisiana supplies.

Combined cost estimate for the expected projects runs to $1 billion. This would include $200 million for processing facilities and $100 million to develop new reserves. Other costs would be $337 million for a 1400-mile pipeline from Alberta, Canada, to San Francisco. And other lines to carry gas from Canada to the Pacific Northwest and Montana.

Applications Backlog—Approval for a gas liquids transmission line is also aiding pipe producers, particularly those making 6, 8, 10, and 12 in. sizes. The line will extend from New Mexico to Kansas where it branches into two lines, one going into Minnesota, the other into Wisconsin. It will cost $71.7 million and will carry butane, propane, and natural gas liquids.

At the end of 1959 there were 198 applications for pipeline construction and operation permits before the FPC. They involve 7361 miles of pipe and a total project cost of more than $1 billion.

Spending Survey—Pipeline projects were not hurt too badly by the steel strike and the industry anticipates a good year. GAS Magazine's annual construction survey of 226 distribution, transmission and integrated gas companies indicates $2.2 billion has been budgeted for this year. Main pipeline companies alone expect to spend $1.23 billion for 7515 miles of pipelines.

However, linepipe producers don't have long-term orders as they did in 1957. Then they were committed four years ahead. For example, Republic still has some commitments into 1961, but not beyond.

Linepipe imports aren't a market factor. Foreign mills mostly export smaller sizes. But U. S. mills don't export much either.

Inventory Problems—U. S. mills aren't able to produce for inventory because of the variety of sizes and bulk of the product. In open country, for example, the pipe has thinner walls because there is less danger from an explosion. But in populated areas, higher safety factors are required.

Size of pipe used in the U. S. has been slowly but steadily increasing. Thirty-inch pipe used to be standard, but some 36-in. pipe has been used on a line from Houston to New York. And Kaiser Steel Corp. and Bethlehem have tooled up for 42-in. pipe.

ALONG THE LINE: New pipelines, such as this one for Northern Illinois Gas Co., are bolstering the market for linepipe in the U. S.

Builders Led Steel Use in '59

Construction Took One-Fourth of All Steel Shipped

Steel shipments to consumers last year totaled 69.3 million tons, almost 10 million more than in 1958.

IRON AGE analysis shows building industry was largest user, followed by automotive.

■ The construction industry was the largest user of steel in the U. S. last year.

The builders topped steel consumers in a special IRON AGE analysis of American Iron and Steel Institute reports of finished steel shipments. A key part of the analysis was redistribution of service center tonnage—almost 20 pct of all mill shipments—among actual consuming industries.

Automotive Second — This division of distributor tonnage greatly changes the final position of major steel consumers. (See table below.) With it, construction, (25.1 pct of mill and warehouse shipments), placed first before automotive (22.5 pct). Without it, automotive received the largest share of mill shipments with warehouses second, and construction third.

The special study was completed for The IRON AGE by Herman B. Director Associates, Inc., Washington, D. C., an organization specializing in statistical and market planning data.

In the IRON AGE refinement of AISI data, two industry groups tied for third place among consumers, each with 9.7 pct of shipments. They were the container industry and the industrial machinery, equipment, and tool industry.

Other Leaders — Other leading steel consumers were: Converters and processors, 4.7 pct; oil and gas drilling, 3.9 pct; electrical machinery and equipment, 3.8 pct; rails, 3.6 pct, and appliances, utensils and cutlery, 3.1 pct.

The study was based on AISI reports of 1959 shipments of carbon, alloy and stainless steel products. In the AISI report shipments to

Steel Distribution by Consuming Industries

	Total Shipments from Mills and Service Centers		Direct Mill Shipments Only	
	Net Tons	Pct	Net Tons	Pct
Construction (includes maintenance and contractors' products)	17,062,213	25.1	12,087,374	17.8
Automotive	15,310,459	22.5	14,213,875	20.9
Machinery, Industrial Equipment and Tools	6,592,754	9.7	4,158,328	6.1
Containers	6,572,858	9.7	6,318,229	9.3
Converters and Processors	3,228,827	4.7	3,133,407	4.6
Oil and Gas Drilling	2,621,064	3.9	540,538	0.8
Electrical Machinery and Equipment	2,585,850	3.8	2,051,577	3.0
Railroads	2,477,503	3.6	2,356,840	3.4
Appliances, Utensils and Cutlery	2,108,423	3.1	1,829,202	2.7
Non-Classified Shipments	2,029,068	3.0	2,029,068	3.0
Other Domestic and Commercial Equipment	2,009,944	3.0	1,832,766	2.7
Agriculture	1,479,757	2.2	1,264,988	1.9
Bolts, Nuts, Rivets, and Screws	1,243,945	1.8	1,071,142	1.6
Forgings (non-automotive)	1,171,730	1.7	956,893	1.4
Shipbuilding, Marine Equipment	781,677	1.2	641,887	1.0
Aircraft	270,506	0.4	71,343	0.1
Mining, Quarrying, Lumbering	242,109	0.4	234,945	0.3
Ordnance and Other Military	151,299	0.2	127,434	0.2
Warehouses and Distributors	—	—	13,048,754	19.2
Total Domestic Shipments	67,939,986	100.0	67,968,590	100.0
Export	1,437,081	—	1,408,477	—
Total Shipments	69,377,067	—	69,377,067	—

IRON AGE distribution of data supplied by American Iron and Steel Institute.

steel service centers are listed as a single market class.

These distributor tonnages accounted for 19.2 pct of all mill shipments during 1959, including 19.5 pct of carbon, 11.4 pct of alloy, and 41.1 pct of stainless steel.

Distribution Varies—In addition, the amount of shipments which reach consumers through service centers varied with each product. For example, only 3.1 pct of all rails moved through distributor sources in 1959. However, warehouses handled 72.1 pct of all standard pipe.

To get a better picture of actual steel consumption, the 13 million tons of warehouse steel must be reassigned to consuming industries. Because each product has its own pattern of distribution, it is necessary to develop a service center pattern for each.

How It's Done—In the case of stainless steel, a joint study made by steel producers and service centers for the first half of 1956 is used. This provides a basis for identifying the industries to which service centers ship their stainless.

However, similar studies are not available for carbon and alloy steel products. But the U.S. Census Bureau has published, based on the 1954 Census of Manufactures, a summary of steel consumption for each industry with a four digit SIC (Standard Industrial Classification) number.

This data, when compared with reported mill shipments, gives a base for determining the amount of steel received directly from mills, plus the amount received from service centers or from consumer inventories.

Divided by End Use—By treating each product in terms of its particular end use, warehouse shipments are then reallocated among steel-using industries. Adjustments are also made to account for withdrawals from company-held inventories.

Large Tank Market Attracts Enamelers

Industrial sales of enamel-on-steel containers are a promising market for enameling companies.

A. O. Smith Corp. predicts a large part of the output of its new plant may go into industrial market in three years.

■ The enameling industry has a new market to explore and it looks hot.

The market: Industrial applications for large enameled containers. Typical of the potential is the experience of A. O. Smith Corp.'s new $2.1 million vitreous enameling plant at Kankakee, Ill. The unit began pilot production of outsized enamel coated parts in January. By this month it's estimated to be producing large enamel coated steel structures at over a $1 million a month sales rate.

Many Interested—The Kankakee expansion is A. O. Smith's first major entry into a new field—enameled tanks for industry. But the entire enameling industry is also interested.

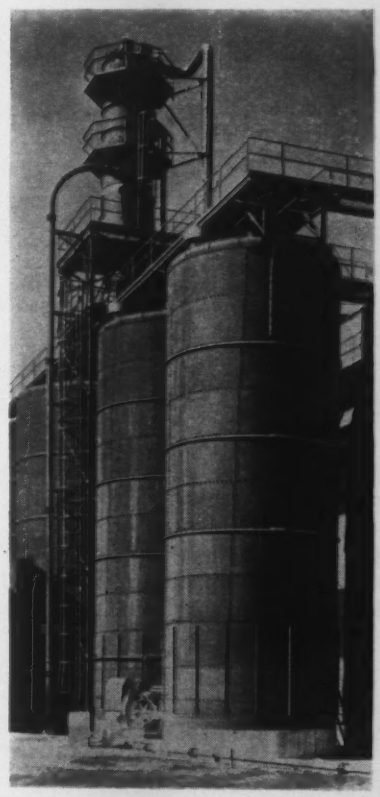
Research is going on among major producers of enameling grade steels — including Armco, U. S. Steel, Republic Steel, and Inland Steel. Bethlehem Steel recently introduced a new enameling sheet. Youngstown Sheet & Tube is also studying the market.

Based on Appliances—Nationally the enameled steel market is still largely confined to appliances. According to industry estimates, about 65 pct of enameling business is in the appliance field. But even so, the dollar value is large.

Steel enameling was a $418.3 million market in 1959, could reach the $500 million mark this year.

Production of the "Harvestore," a glass-lined farm silo was begun by A. O. Smith in the early 1950's. This product inaugurated Smith's entry into king-sized enamelware. And agricultural sales of large enamel containers still account for 90 pct of output in this size category.

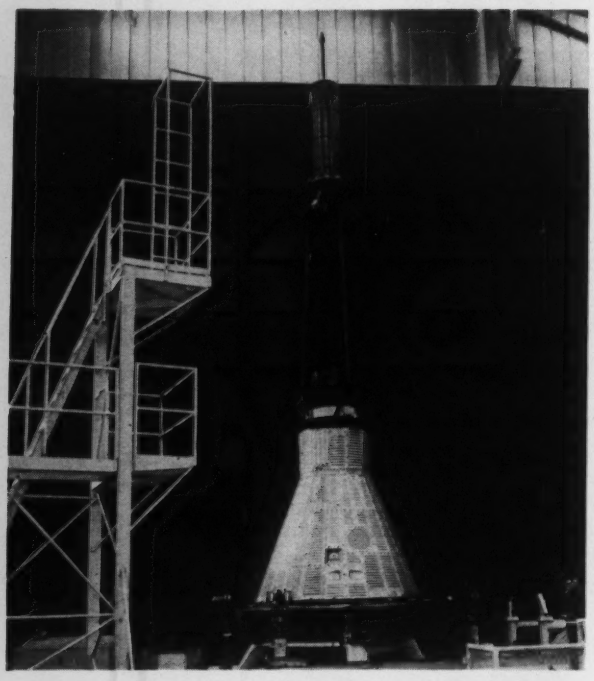
Tempting Prospect—"But we've only scratched the surface of the industrial market for large enameled containers," says an A. O. Smith official. "It's possible that, within three years, 50 pct of our large tank output will be going into the industrial market. And we've still got a long way to go in selling our tanks to the farm market."



ENAMELED FOR INDUSTRY: Glass-fused-to-steel mechanized storage tanks, built by A. O. Smith Corp., are used here to hold dry starch and clay.

Aerospace Research Assumes Some Strange Shapes

MODERN MUSHROOM: This mushroom-shaped lantern is really a geodesic radome being tested by General Electric Co. Radome is erected on a new radar test tower designed and built by E. W. Bliss Co., to determine how much a radar receiver is "fooled" by the radome on which it is mounted.



CAPSULE COMMENT: First Project Mercury space capsule, to be used in pilot escape system tests, has been delivered by McDonnell Aircraft Corp. to the National Aeronautics and Space Administration. It is 9 ft high, 6 ft wide at the base. A similar capsule will carry the first American into orbit.

Bethlehem Expands At Sparrows Point

Bethlehem Steel Co. has released details of the expansion program for its Sparrows Point, Md., steel mill.

Rated ingot capacity, already the nation's largest at 8.2 million tons, will be increased by 800,000 tons to 9 million tons. Most of the increased tonnage will be provided by adapting the plant's new No. 4 Open Hearth Shop for the use of oxygen. This shop contains seven furnaces rated at 375 tons each.

Other Projects—According to C. T. Stott, general manager, the overall program includes a number of other projects. These include:

Rebuilding a coke oven battery, increasing iron ore sintering capacity, addition of new soaking pits, modernizing the 60-in. plate mill, modernizing the 56-in. hot strip mill, adding a new continuous annealing line for tin plate, adding new capacity in the wire drawing and bethanizing departments, and installing a new fuel oil storage and distribution system.

Objectives—Mr. Stott gave the following as objectives of the new expansion program:

Increased efficiency in steelmaking operations; continued improvement in the quality of products; extended range of weight and size of some products; and improved materials handling, including shipping.

Construction on all phases of the program will be underway this year, he said, with some being scheduled for completion by December. Others won't be completed until 1961 or later.

German Steel Output At 95 Pct Last Year

West Germany's crude steel operations ran at over 95 pct of capacity in the fiscal year ended Sept. 30, 1959. The country's capacity is 29 million tons.

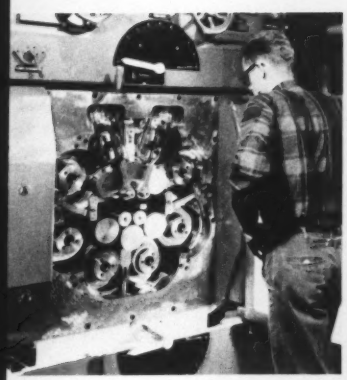
Reflecting the healthy rate of production is the operation of one of West Europe's biggest steel and pipe manufacturers. Phoenix-Rheinrohr A.G., turned out 2,393,000 tons of crude steel, 1.4 pct more than 1958. Output of tubes and pipes rose 18.4 pct to 583,000 tons.

Rocket Contract

Thiokol Chemical Corp.'s Longhorn Div. at Marshall, Tex., has received a $10.5 million continuation contract from Army Ordnance Ammunition Command for production of rocket motors and plant maintenance.

Recently, Thiokol developed a new continuous mixing process for the production of solid propellant rocket motors. It is said to add to production capability as well as low cost for this type motor.

Superior's new SENDZIMIR Mill



Close-up of the 18 back-up rolls providing tremendous power and rigidity to super-finished work rolls, for flawless precision strip production.

Fine-watch precision—
great power, rigidly controlled!

The ultimate in dimensional accuracy and finish is now available in Superior Strip Steel . . . in widths up to 24" . . . in larger and heavier coils . . . thanks to our new Sendzimir Mill with electronic continuous gage control. Strip is reduced to final gage at speeds reaching 1,000 feet per minute—every foot within required tolerances, beautifully finished for your most particular product requirements. Let us serve you with Superior Strip Steel *finer than the finest obtainable until now!* Write us about *your* requirements.

Superior
STRIP STEEL

SUPERIOR STEEL DIVISION
OF
COPPERWELD STEEL COMPANY
CARNEGIE, PENNSYLVANIA

For Export: Copperweld Steel International Company, New York

With this Campbell Machine, you can--

Cut 6-inch Diameter Hard Alloys-Cleanly and Accurately-in Less Than 3 Minutes!

• This Campbell wet abrasive cutting machine—the Model 406—will cut tubing, bar stock, angle iron, or any other shape up to 6″ round or square—and it will cut practically *any* material, including the new super alloys and exotic metals. Like all Campbell machines, it's designed to give *accurate* cuts, quickly and cleanly.

HIGH SPEED—4 to 8 seconds per square inch is the normal cutting speed for all Campbell wet abrasive cutting machines. For instance, you can cut 6″ diameter hardened steel in less than 3 minutes.

ACCURACY—Campbell machines are production machine tools. They cut within close tolerances to reduce rejects and scrap loss. For example, the Model 406 will cut 3″ diameter material to lengths within ±.010″, 6″ diameter within ±.030″.

FINE FINISH—Additional finishing operations are rarely required. There is no burn, and burr has been reduced to an absolute minimum.

POWER OSCILLATION—On an oscillating-type machine such as the Model 406, the cutting wheel is moved horizontally back and forth *across* the cut as the wheel is fed downward. The result—greater cutting capacity, with longer wheel life.

PROPER COOLANT APPLICATION—Large reservoir and a 33 gallon/minute pump provide high volume of coolant. Unique Campbell distributor applies coolant equally to both sides of the wheel—an essential requirement for accurate cuts.

OTHER CAMPBELL MACHINES FOR ANY CUT-OFF NEED

Choose from four types of Campbell machines for wet or dry cutting—chop stroke, oscillating, horizontal or rotary—with capacities up to 14″ rounds, 12″ billets, plate up to 6″ thick and 20 ft. long.

Regardless of your application, you'll find that a Campbell machine provides you with the best cut-off method for modern production techniques—far more efficient, accurate and economical for cutting many materials than other cutting equipment.

WRITE FOR DETAILS—Bulletin DH-260 gives the complete story on the Campbell Model 406 abrasive cutting machine. We'll also be glad to send you information on other machines; just tell us your cut-off application. And remember—your Allison-Campbell Field Engineer is an abrasive cutting specialist. Call on him for expert advice.

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David S. Fine

His Work Lives as Landmarks

After 44 years as a top construction man for American Bridge Div. of U. S. Steel Corp., David S. Fine retires.

With him goes a long and impressive record of building.

DAVID S. FINE: Always stress the positive approach.

■ Later this month David S. Fine will retire after 44 years of service with the American Bridge Div. of U. S. Steel.

When he leaves as the company's New York district construction manager, he'll take with him an enviable record. The projects he's supervised over the years read like a who's who in building.

Bridges and Buildings—Among other projects, Mr. Fine is responsible for the steel work on the Henry Hudson Bridge over the Harlem River, the Secretariat Building and Assembly Hall at the United Nations, the Perisphere, Trilon and other buildings at the 1939 New York World's Fair, a portion of the Pulaski Skyway, and various New York office buildings.

Recently he directed the cable work on the new Throgs Neck Bridge in New York City.

Construction work has been a way of life for Mr. Fine since he graduated in 1916 from the Univ. of Pennsylvania with a degree in civil engineering.

Defense Projects—He went right to work with the then American Bridge Co. as a draftsman in its Philadelphia plant. When World War I broke out he was transferred to the Erection Dept. of American as a field engineer on various defense projects.

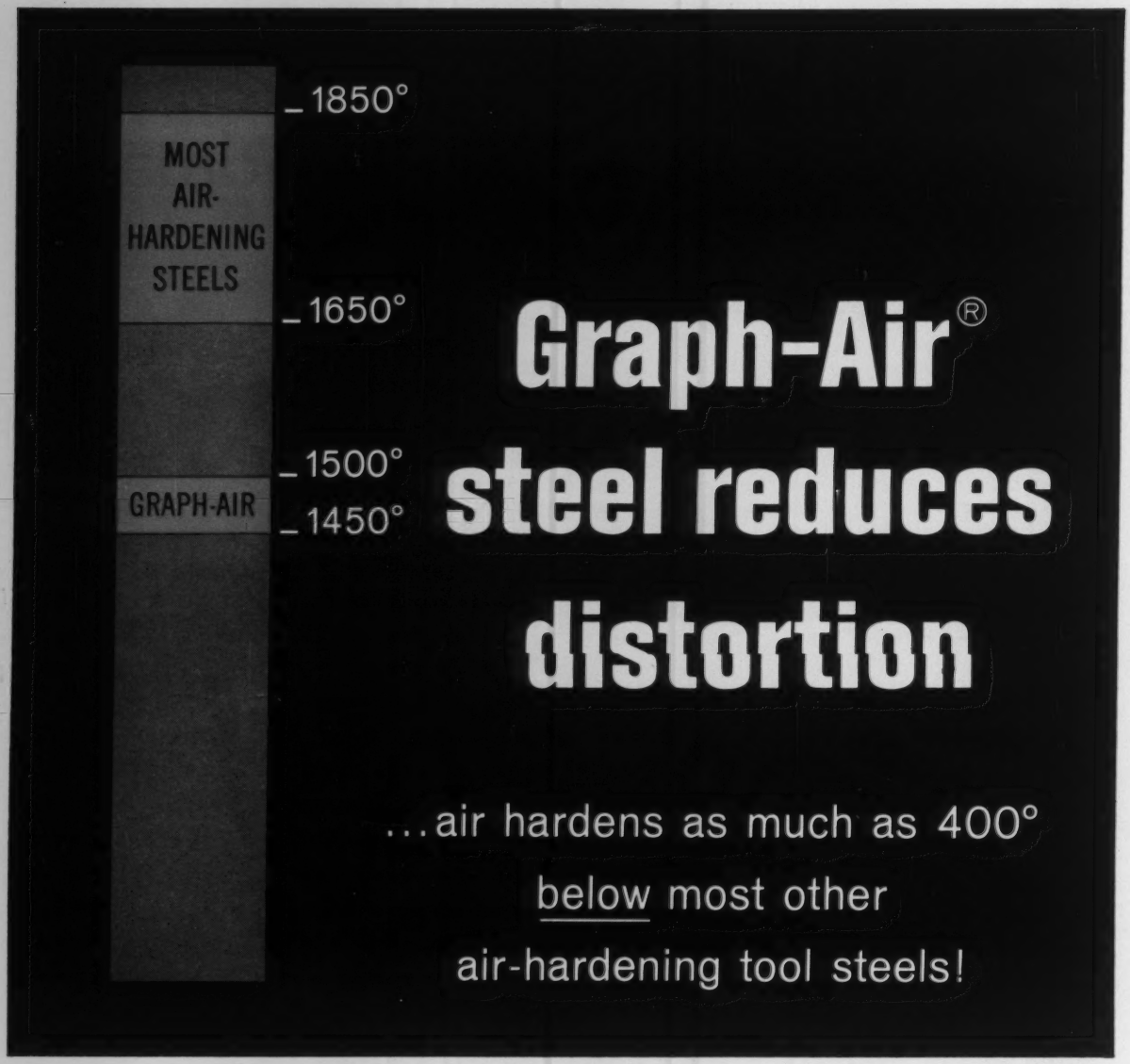
During the 1920's and early 1930's, Mr. Fine was the erecting engineer on many bridges in the eastern United States. In this period he supervised the work on the Bayonne Arch Bridge over the Kill Van Kull from Bayonne, N. J., to Staten Island, N. Y., and on the eastern portion of the Pulaski Skyway from the Hackensack River to Tonnelle Ave., Jersey City.

Beginning in 1935, first as Erecting Manager and later as District Construction Manager, he was responsible for the building of many steel structures in the N. Y. metropolitan area and in the northeastern United States.

Success Secrets—Important in Dave Fine's success has been his ability to get along with people. He has a wide circle of friends among engineers, contractors, customers, and union leaders. He has always taken a leading part in labor relations work with unions represented in steel construction work.

Mr. Fine has a four-point business philosophy he believes in—and uses. Its basic points are: Always adopt the positive approach. Never get angry. Remember the best defense is a good offense. Talk things over with associates to find the right answer to a problem.

Likes to Travel—A widower, Mr. Fine has two daughters and three grandchildren. His hobbies are many, but traveling is one of the favorites. After retiring, he's planning a round-the-world trip with visits to Hawaii, Asia, and Australia.



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Revamp Capital Goods Selling

You'll need to re-examine your sales methods to sell the capital goods market in the next ten years.

Greatest need for U. S. manufacturers: Improved sales and marketing techniques.

■ If you market capital goods, the next ten years will bring plenty of sales opportunities—and problems. To meet changing market conditions, you'll need to revamp old sales techniques and develop new ones.

What's ahead for capital goods makers is spelled out by Richard R. MacNabb, economist and secretary of the Machinery and Allied Products Institute in MAPI's Capital Goods Review.

Growing Competition — Marketing organizations in U. S. companies will need to be re-examined in the light of foreign competition, Mr. MacNabb points out. This competition will not only continue in the '60's, but probably tighten.

He lists two prime reasons for this: Large-scale mass-production techniques abroad made possible through combinations of marketing areas such as the European Common Market; and, the high wage and fringe benefit costs in the U. S.

The result: "These two factors are likely to offset any reasonably projected increase in foreign wage levels."

To meet competition abroad — and at home—he predicts more U. S. companies will set up overseas plants or operate under licensing agreements with foreign producers.

World-Wide View — This international sales approach will increase the scope of the marketing function, Mr. MacNabb says. "Sales and promotion techniques must be attuned to the demands of both foreign and U. S. markets." There will be more attention to foreign licensing, subcontracting, and similar arrangements.

All this leads to another need: More market intelligence about foreign markets. "When products were simply shipped abroad, this situation was perhaps tolerable; now that our goods must be sold abroad, these gaps in commercial intelligence may cause present markets to be lost and potential markets overlooked."

This decline in machinery sales abroad is stressed by export-import statistics. Machinery imports (as a pct of exports) have moved from 2.4 pct in 1947 to 8 pct in 1953 and 16.7 pct in 1959.

. . . As Market Shifts Increase

■ This battle for overseas sales goes on while market struggles increase in the U. S. Technological changes are causing wide shifts in markets, the MAPI economist stresses. "Product lines are being crossed within industries and between industries. Inter-industry as contrasted with intra-industry competition may be the most significant development of all."

Specialized Selling — Marketing men must be alert to these shifts, he adds, and flexible enough to take advantage of the new markets.

Capital goods marketing means selling highly specialized engineering knowledge. This trend will grow with the salesman sometimes going beyond being an "industrial equipment analyst" and becoming an "engineering economist."

Attention to Costs — Lack of emphasis on engineering knowledge as an end product of capital goods manufacturing has lead to failure to recover engineering costs in some cases, Mr. MacNabb points out.

In the coming decade spending to modernize or replace equipment will go on representing a substantial part of the capital goods market. This will give marketers a chance to concentrate on selective selling. "Organization of well-planned sales programs for specific target areas provides new challenges for effective marketing," says Mr. MacNabb

Business Leaders See Few Employment Gains

Only 32 pct of a cross-section of 2500 business leaders look for employment increases this quarter, Manpower Inc. reports.

The employment and business service firm finds 61 pct of the executives seeing no change with 3 pct looking for a decline.

In its latest quarterly survey of employment needs, Manpower, Inc., indicates that 62 pct of foundry, steelmaking or rolling mill executives expect no change in second quarter employment needs. Twenty-three pct forecast an increase with 6 pct expecting a decrease.

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"BRISTOL FASHION" MEANS BRASS AT ITS BEST

Detroit Readies '61 Models

Shorter, Slimmer, Lighter Cars Are Coming

The emphasis on economy will continue as some standard models get smaller.

Four new medium-compacts are on the way. And Volkswagen-size units may not be far behind.—By A. E. Fleming.

■ Will there be many changes in 1961 model car styling? How about engineering advances? Will more new models enter the market? Will some oldtimers leave?

For the most part, looks won't change very much. Sheet metal alterations will be minor except in a few cases. Detroit's tool and die makers say General Motors Corp. is giving its lines the most extensive beauty treatments, especially Chevrolet, Pontiac and Oldsmobile.

Rear deck area and rear fenders are the main targets of the designers. Chevrolet, for example, is de-emphasizing the spread eagle look of its rear fenders. One reason is to provide more trunk space; another is to make it easier to get things in and out of the trunk.

Changes in the End—Big, round taillights will reappear on Fords. Plymouth taillights will also change. And the Valiant will shed the pseudo spare tire holder on the trunk lid.

Most of Chrysler Corp.'s new model money is pouring into Plymouth. The car will look jauntier, absorbing some of the Valiant flavor. Plymouth fins are finished. But here's one intriguing rumor: Plymouth will offer fins as an extra cost option—a unique idea even if it isn't carried out.

At American Motors Corp. and Studebaker-Packard Corp., reports persist that styling changes will not be major, perhaps some new grille and trim treatment.

Raise the Roof — Inadequate headroom has been perhaps the greatest object of styling criticism the past couple years. Improvements will be made. Added area will come from slightly higher roof lines, maybe an inch or two.

But the trend toward shorter, narrower models will continue. Some will reduce length as much as 4 in. This means lighter cars, in keeping with the trend to fuel economy.

There will be a rash of new makes. Medium-compacts of GM and Chrysler will draw the most interest. There's a possibility at least one company will come up with a Volkswagen-size model.

More Compacts — The Buick compact, using the Corvair body shell and some of its components, will emerge as a 112-in. wheelbase car. It will be a few inches wider than Corvair, almost a foot longer. There will be four-door sedans and station wagons in two series. The front-mounted engine will be a 215 cu in. V-8 made largely of alumi-

---

Europe Expects U. S. Small Car

■ An English automaker foresees the possibility of U. S. carmakers bringing out made-in-America small cars. And Europe's new trade blocs could cause additional problems for European automakers.

P. P. Copelin, chairman of England's Vauxhall Motors, Ltd., says he believes American automakers will "try to find an answer" if imported cars continue to take 10 pct of the U. S. market.

Size Differences—"We have to remember that the so-called 'compact' cars introduced by U. S. manufacturers are still rather bigger than anything Vauxhall makes," he points out. "But I believe that if imports continue at their present level the U. S. industry will try to do something about it."

However, Mr. Copelin denies suggestions that Vauxhall, a subsidiary of General Motors Corp., would bring out cars smaller than its present lines. (For a new mini-car, see p. 122.)

No Time to Change—"We see no reason to alter our production lines at this time," he says. "The 1.5 litre class (91.5 cu in. displacement) accounts for about 35 pct of the market."

He expresses concern over trade prospects in Europe, noting that the threat of a trade split in Europe is serious. For one thing, French and German manufacturers hold a "considerable advantage" in transport costs in the European market.

Commenting from the viewpoint of a European marketer, he warns of the impact of a split between Common Market nations and the Outer Six trade group: "It might well become difficult to maintain an adequate dealer organization in Europe without cutting profits to the bone."

num. Reports are it will be advertised at around 135 hp.

Ditto for the Oldsmobile compact on the above dimensions. However, Olds horsepower may be advertised closer to 150.

The Pontiac compact, too, will use the Corvair shell. Overall dimensions will parallel Buick and Oldsmobile compacts. The main difference will be under the hood. Pontiac will offer the same V-8 as an option.

Two From One?—But the standard engine for Pontiac's compact will be a hefty, slanted four-cylinder job, placed up front. The engine will use many parts of the present Pontiac V-8. In fact it might be described as being half the present Pontiac V-8 in size and appearance. Displacement is just under 200 cu in., horsepower will be around 125. It will be tilted to give the car a lower hood line and lower center of gravity.

The four-cylinder engine has a cast iron block. It will be water-cooled, although an aircooled type was researched.

The Dodge compact will rest on a 111-in. wheelbase, using the Valiant shell. Its aluminum engine will develop over 100 hp, and there might be an optional engine of higher horsepower. In either case, they'll be 6-cylinder, tilted at a 30 degree angle like the present sixes of Plymouth, Valiant and Dart.

Pair of Sixes—Elsewhere, American Motors is developing a V-6 engine. It's very compact, so it can be moved far forward to help reduce the front seat area transmission bulge. Studebaker is working on a 6-cylinder engine, too. It's an inline type with more power than the present Lark six.

There may be other new models. U. S. manufacturers are interested in small, four-passenger cars that would vie with Volkswagen and Renault. In fact, word is Chrysler Corp. has been installing equipment and machinery in its Hamtramck, Mich., assembly plant for turning out such a car.

The same sources say Valiant assembly will be pulled out of Hartramck this fall, with the small car taking its place there. They also say this is the car that will be called the Warrior, the name first applied to the Dodge compact which is now carrying the Lancer tag.

Bugs From Detroit?—Ford also has a little car in the works. It's possible the company will bring it out in the 1961 model year. Wheelbase is 96 in. Engine is aircooled with four cylinders in a cast iron block. Front or rear mounted? It could go either way.

There will be other models, too. More convertibles will show up. Among them: A Rambler American, Valiant, Falcon, Corvair. Lincoln Continental will have both two and four-door soft-top models. And Chevrolet will come up with a Corvair station wagon.

T-Birds' Song — The Thunderbird's popularity is inspiring others to come up with a competitive model. Cadillac has one in mind, a sporty four-door model with a wheelbase around 120 in. There's also a compact Lincoln in the works.

Will any cars fade away? Possibly. Most likely is one of Dodge's standard size models. A Lincoln series might pass away, too. An there's been talk that B-O-P will reduce the number of models it offers.

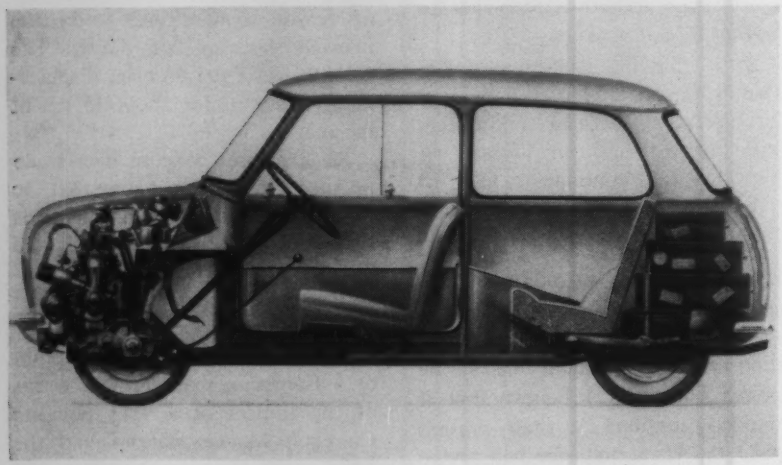
Odds and Ends—Mercury is going to use the same body shell as Ford, although Mercury will be longer overall because of different front and back end treatment. Mercury now has its own shell.

Transaxles may finally show up in standard cars. They'll be GM units, most likely for Pontiac, Oldsmobile and Cadillac. Automatic transmissions of Buick, Olds, and Pontiac standard cars will be shorter, lighter and smaller diameter.

Chrysler will put the alternator on all models. This is the small, lightweight device that replaces the generator, and was introduced on the Valiant last fall.

Aluminum bumpers will bow at some GM divisions.

Latest Import Packs "Crosswise" Engine



WHAT'S UP FRONT: Flat floor of the 10-ft long Austin and Morris 850's is shown in cutaway view. The four-cylinder engine, gearbox, transmission and differential are mounted at right angles to the chassis. Price in the U. S. is under $1300, East Coast port of entry.

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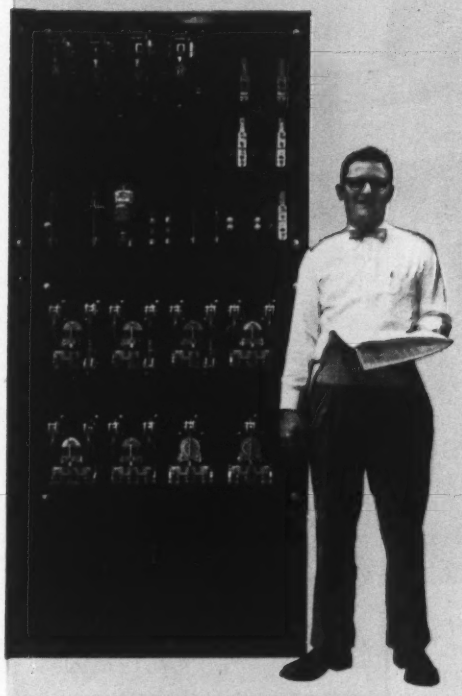

R. M. Bosshart, Manager,
Heavy Duty Metal Rolling Section,
Reliance Electric & Engineering Co.

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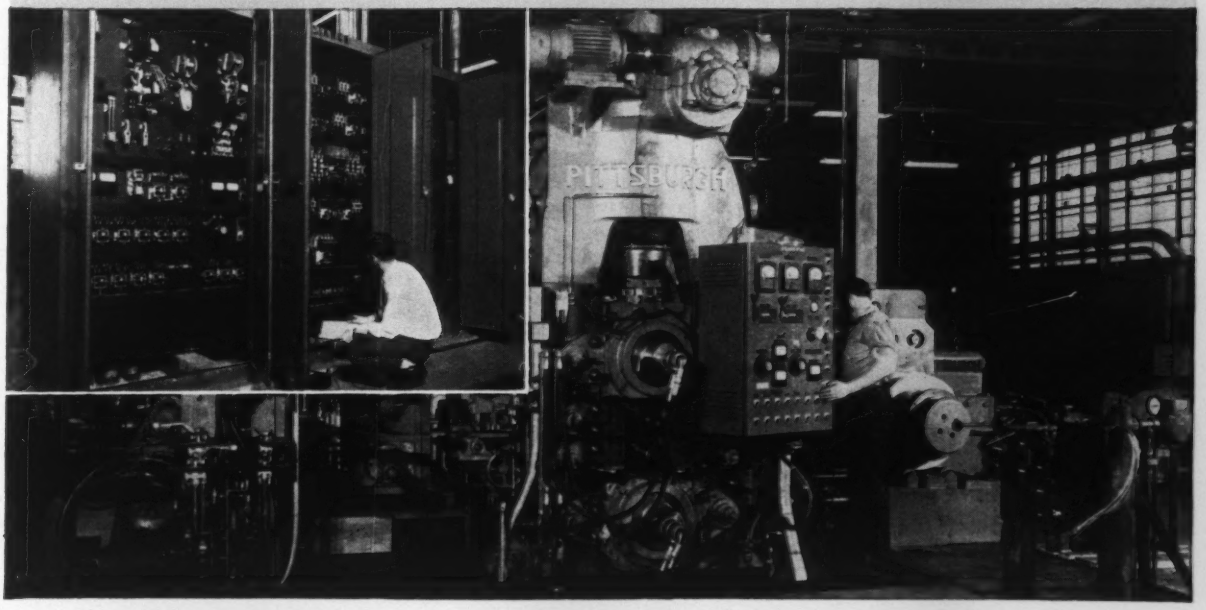

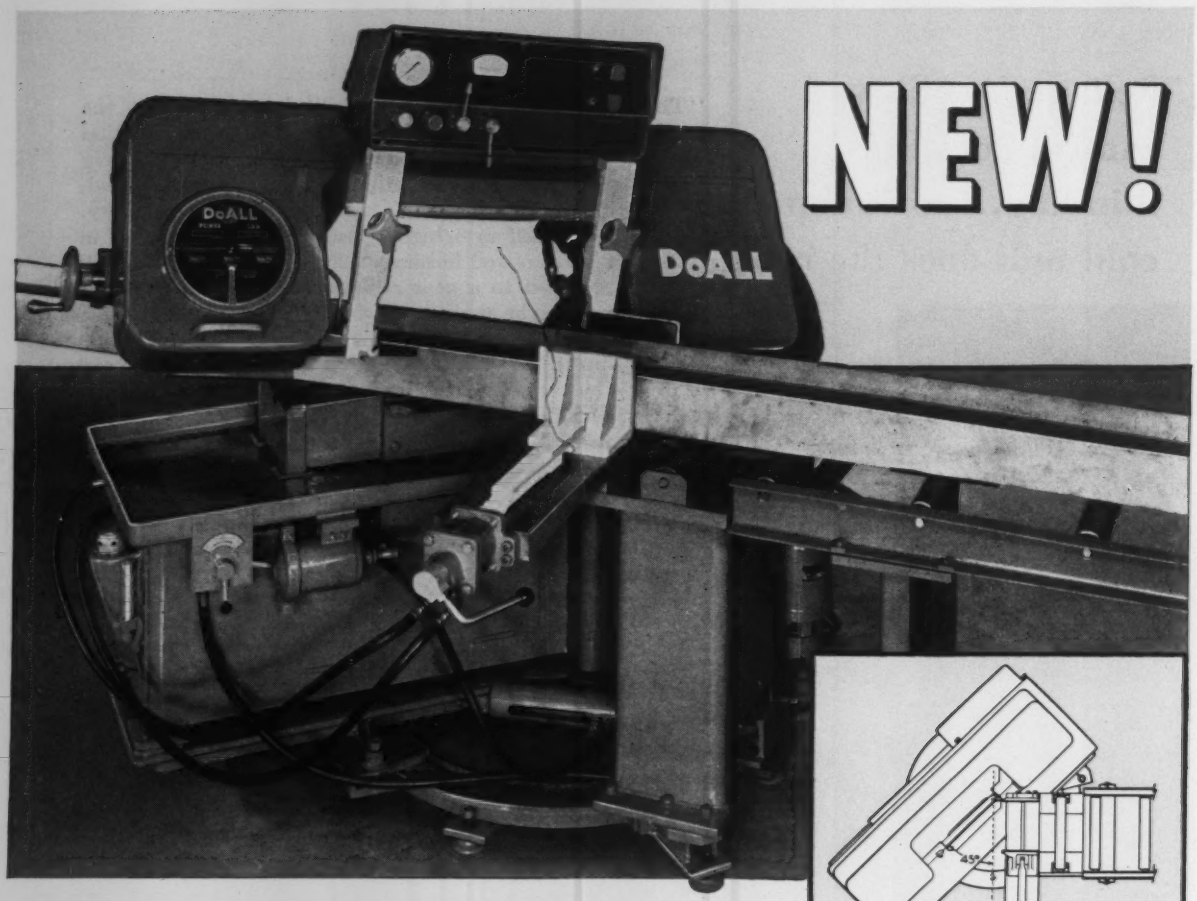

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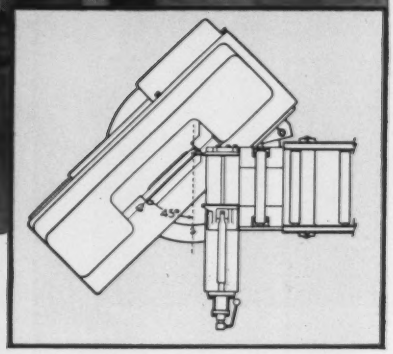
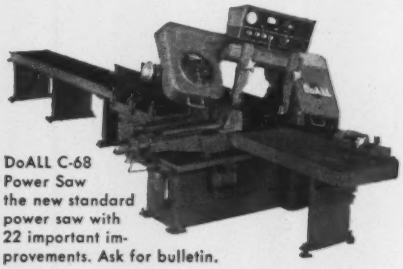


Photo shows DoALL C-167A angle power saw cutting end of 10-in. I-beam to 45-deg. angle. Sketch above shows plan view of C-167A angle power saw. Note how stock table and holding vise remain stationary while cutting head is mounted on turntable that pivots to any angle up to 45 deg. Fixed vise requires no adjustment regardless of angle being cut.



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Congress Shifts Into High Gear

Lawmakers Step Up Pace Under Election Year Whip

With filibuster and Easter recess over, Congress tries to adjourn in time for conventions in early July.

Broad social undertones of election year actions can affect profits.—By G. H. Baker.

■ Congress is about to step on the gas. Now that the Easter recess and the filibuster over civil rights are out of the way, Senate and House leaders are mapping some fast and furious action for the few weeks remaining in this year's session.

Both parties are agreed that the Congress must adjourn by early July in order to free the nation's lawmakers for the political conventions.

Keep in mind that everything Washington does in the months ahead will be strongly influenced by political ambitions. Some rich prizes are at stake: The Presidency, the Vice Presidency, one-third of the Senate seats, and all House seats.

Business executives are to be affected in many ways by what the Congress and the White House do in the weeks immediately ahead. Keep a sharp watch on the following subjects. Each point can bear heavily on your firm's profit picture for 1960:

TAXES—There's some hope for lower rates on overseas investment, but an uphill fight is ahead. But there's little hope for reductions in other rates, especially rates on corporate and individual income.

ANTITRUST—An election-year burst of activity by the government will continue—right up to Election Day. Some businessmen on the receiving end of suits this year are complaining to the Republican National Committee that Attorney General Rogers and FTC Chairman Kintner are "going too far." But Ike backs up his team.

DEFENSE SPENDING — Congress continues to add to the $41 billion budget proposed by Ike. Shift away from conventional hardware (manned aircraft, tanks, for example) toward missiles and space exploration will speed up. Firms located in so-called distressed areas now stand a better chance of getting contracts and subcontracts.

SOCIAL SECURITY — There's a strong prospect of fattening up this giant insurance scheme, including approval of health insurance for oldsters (Forand bill or one of the similar proposals). Both parties view enlarged social security as an election-year "must."

TIGHT MONEY — A limited easing is in the works, and should be apparent by mid-summer. Money already is easier to borrow than it was early this year, but the easing has not yet reached the point of lower interest rates. Rates should be pegged down before long.

LABOR — Sen. Kennedy and other pro-labor politicians are pushing hard for enactment of a bill to permit picketing at construction sites involving more than one contractor. Kennedy tried to get this provision included in the 1959 labor reform bill, but was beaten. He's promised labor leaders he'll push this loophole through the Senate this year in exchange for their support.

Man-in-Space Program Gets Boost

Congress is providing the funds for a speedup in this country's man-in-space program.

The lawmakers have sent to the White House a measure giving the program, dubbed "project Mercury," an extra $23 million for the few remaining months of this fiscal year.

Jump in Home Building Coming

■ Government housing experts aren't joining in the round of gloomy forecasts on the home building outlook for this year.

In spite of slow home-building activity early this year, they still predict that gradually easing money and credit conditions will bring a building spurt in the late spring and summer.

Home-building starts were down about 19 pct in the first few months of the year but began a steady upswing in February.

Also, tight money conditions in the home mortgage market are loosening, according to the Federal National Mortgage Association, which buys existing government-backed home mortgages to help provide funds for new construction.

Official target for housing starts this year is 1,200,000 or more, compared with 1,341,500 last year.

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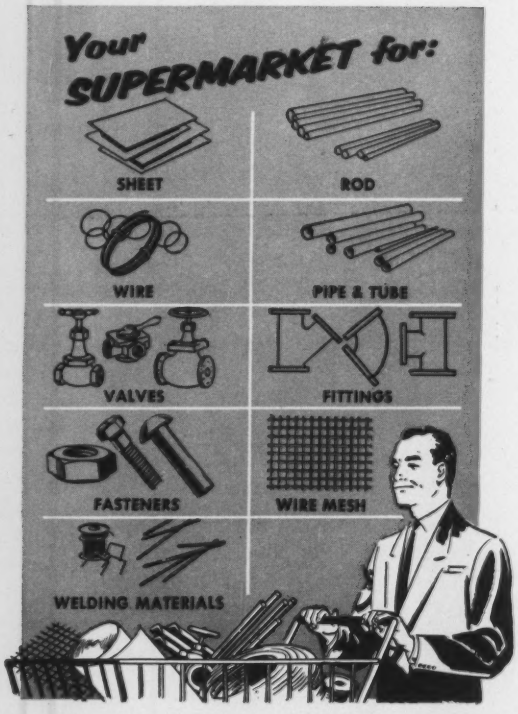

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Anti-Smog Becomes Big Business

Billion Dollar Industry May Develop

With auto exhaust control equipment now required on Calif. cars, a new industry is rapidly developing.

If the plan licks Farwest's smog, other states may also act. —By R. R. Kay.

■ A huge new industry is about to be born—automobile exhaust control equipment. And it could become a $1 billion business in a short time.

California's governor Edmund G. Brown just signed into law a bill which makes an anti-smog device mandatory on new vehicles within a year after two such devices are OK'd.

Used commercial vehicles must have one in the second year. And by the third year, it'll be compulsory on all motor vehicles.

Added Attachment — Californians will probably find their new cars factory-equipped with an exhaust control device. But for their present cars they'll have to buy the attachment themselves.

One doesn't have to be a great mathematician to figure out the size and scope of this new industry. There are 7.3 million cars and trucks in California.

Estimates on the cost of a unit vary all over the lot—from $50 to $500. But people working in the field suggest a $100 to $150 price tag.

Smith Griswold, director of Los Angeles Air Pollution Control District, says that for lower-priced cars, the device will cost $50 to $60.

Ready for '61 Cars?—Right now, some 20 companies throughout the country are working on anti-smog automobile exhaust equipment. And it looks as though several devices will be certified in time to go on the 1961 cars. All this adds up to a whale of a new market for metalworking.

Smog experts insist the new law will lick California's smog problem. If it does, you can bet that there will be a clamor for a similar law in other populous states.

From Air to Sea

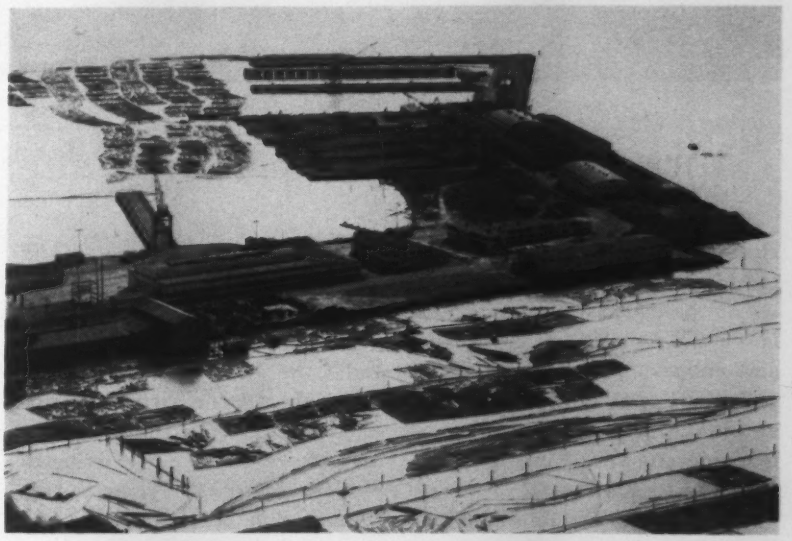
Some of the West Coast's major aerospace firms are flirting with the boatbuilding business. Boeing is interested in the Navy's proposal for a hydrofoil sub-chaser. North American submitted to the Navy a design for a high-speed hydrofoil patrol boat. And Lockheed now owns Puget Sound Bridge & Drydock Co.

Coming: Space Capsule

A space capsule to carry 20 persons on interplanetary junkets is in the works at Boeing, Seattle.

Wellwood E. Beall, the company's senior vice president, says it won't be long before such vehicles will be in use between the earth and the moon. They'll have propulsion systems which are not yet perfected, but "right around the corner."

Ready to Turn Out Marine Gear



OUT OF MOTHBALLS: Manufacturing facilities of mothballed U. S. Navy shipyard at Everett, Wash. have been bought by Western Gear Corp. in $500,000 expansion program. Operations of the company's Seattle plant will be transferred to the Everett location.

Quality . . . the best economy of all

Electronic parts courtesy Judson Mfg. Co., Inc., Cornwells Heights, Pa.

Mirror-bright without polishing, after switch to Sunicut

Boring on a multiple-spindle automatic produced the finish you see on these electronic parts. Sunicut 102-S Cutting Oil saved time and money by eliminating the polishing operation. The same automatic uses Sunicut 102-S to machine metals ranging from titanium to stainless 410.

Sunicut 102-S is one of a full line of cutting oils known throughout metalworking for maintaining long tool life, close tolerances, and fine finishes. There's a grade of Sunicut that can help you improve your product quality—and *that's* the best economy of all.

To choose the right Sunicut, ask the Sun man; that's part of his service to you. Or write to SUN OIL COMPANY, Dept. IA-4, *Philadelphia 3, Pa. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

SUNOCO

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

Automation's Effect on Workers

New Study Plots Social Changes That Result

There are traps to avoid in planning major changes such as automation.

To reap maximum benefits, the human factors must be considered.—By R. H. Eshelman.

■ Everyone talks about the impact of automation on labor. But up to now there's been little more than talk. Now two professors have released a study of how automation affects the worker. The study is based on "depth" interviews in a very advanced plant.

A major conclusion emerges for the metalworking industry: Plant managements and machine designers will have to take into account psychological and other human factors if they want automation installations to succeed. This will be even more important in future plants using equipment with "feedback" type automation, contrasted with more common open-loop control (Detroit automation) found in most mass-production plants.

The Human Factor?—That's why this study, made in a completely instrumented power plant, is so significant. It squarely poses the question: Will the human factor come to the fore in design of our factories of the future?

Surprisingly, in the survey workers in the new plant reported their jobs more interesting and rewarding. But this seemed almost accidental. It resulted from broadening of responsibilities and job rotation.

"This shows there can clearly be some plus social factors in automation," authors of the report state. The complete report is entitled "Automation and the Worker: A Study of Social Change in Power Plants," by F. C. Mann and L. R. Hoffman.

Beware of Snares—The two University of Michigan social scientists warn of several traps awaiting industrial planners of major technological advances such as automation. Some of them are:

1. Failure to consider human and technological change together. The big investment demanded by automation puts planning on a high management plane. After installation, management attempts to patch up psychological and sociological problems that have been overlooked. Planning should include both technology and worker.

2. Committing resources too soon to one irrevocable plan. Automation should proceed in stages, with as many alternatives left open as possible.

3. Overlooking total impact of automation. Applying it in a single area will affect the entire company. While the change may create prestige jobs for a few, it may downgrade many more. Companies should clearly state their policies toward displaced employees.

4. Pressing too hard for peak production from newly automated plants. Workers and supervisors should have a chance to make some trial runs without pressure. People frequently fear new machines they manage. Breakdowns can follow.

Standard Parts Become Special Machine

BORING JOB: This special machine was built by Ex-Cell-O Corp., Detroit, using building-block techniques. It bores, counterbores, and trepans a cast iron workpiece, handling four holes at once.

INDUSTRIAL BRIEFS

Green Pastures — Giddings & Lewis Machine Tool Co. has agreed to sell its Cincinnati plant to The Cincinnati Milling Machine Co. The transaction involves real estate only. G&L will move the manufacturing of its drilling machines into Wisconsin where it operates machine tool plants in Fond du Lac and Kaukauna.

Handling Hot Rods — Lear, Inc.'s Industrial Products Group has received a contract to produce 10 remotely operated automatic control systems for nuclear reactors being developed by The Martin Co.'s Nuclear Div. The specially designed control rod positioning systems will be used in critical tests where fine precision measurements are required.

Identification Marks—Pittsburgh Coke & Chemical Co. has embarked on a program to give greater identity to its operating groups. It has formed Pittsburgh Chemical Co. which serves the chemical industry. Green Bag Cement Co. and the recently acquired United States Concrete Co. will provide cement and concrete products to the construction industry. The company is maintaining its Coke & Iron Div. which markets its foundry and metallurgical coke, pig iron and ferroalloy products in the metals industry.

Even Losers Win—In the 1960 Design Contest sponsored by the Gray Iron Founders' Society, each bona fide entrant will receive a $10 Gray Iron Castings Handbook. First prize will be $500 in cash plus a citation. Entry deadline is May 31. Official entry blanks are available from Gray Iron Founders' Society, Inc., National City-E. 6th Bldg., Cleveland 14, O.

Play It Safe—Two divisions of Jones & Laughlin Steel Corp. were honored at the National Safety Council's annual Safety Engineering Conference in Pittsburgh. J&L's Aliquippa Works received the Council's top award, the Award of Honor, and its Research Laboratories received an Award of Merit.

Building at Belmont — Cutler-Hammer, Inc., plans to build a new plant at Belmont, Calif., to house manufacturing, sales and warehouse activities. It will replace present facilities in San Francisco and San Jose. The plant will produce motor control lines and power distribution equipment.

Vertol to Boeing — Boeing Airplane Co. has acquired all of the assets and assumed all obligations of Vertol Aircraft Corp., Morton, Pa., which has been made a division of Boeing. Vertol's subsidiaries, Allied Research Associates, Inc., of Boston, and Canadian Vertol Aircraft, Ltd., of Arnprior, Ont., Canada, will continue their present relationships as Boeing's subsidiaries.

Five Into One — Two manufacturing divisions and three subsidiaries of P. R. Mallory & Co., Inc., have been combined in a new metallurgical and mechanical group. Included in the group are Mallory Metallurgical Co., Indianapolis; Electronic Timers Co., Warsaw, New York, and Pana, Ill.; Philadelphia Bronze & Brass Corp.; S-M-S Corp., Detroit; and Indar Corp., Indianapolis.

Moving to the Delta—Industrial Machine and Tool Co., formerly of Indianapolis, Ind., has begun operations at its new location—Cleveland, Miss. The company manufactures tool and die products and molds and does special tool welding.

Magic City Acquired — Schuler Equipment Co. has purchased the assets of Magic City Iron and Steel Co. Both firms are located at Birmingham, Ala. Magic City will now become the Schuler Steel Div. of Schuler Equipment Co. It will fabricate three products—long span joists, structural steel, and ornamental iron.

Can Doings — Plans to expand the American Can Co., Canco Division's Research Center in Barrington, Ill., have been announced by the company. The new addition will be used in the development of containers of the future. Research efforts will be directed into new methods and processes for making containers of steel and ferrous alloys and other materials.

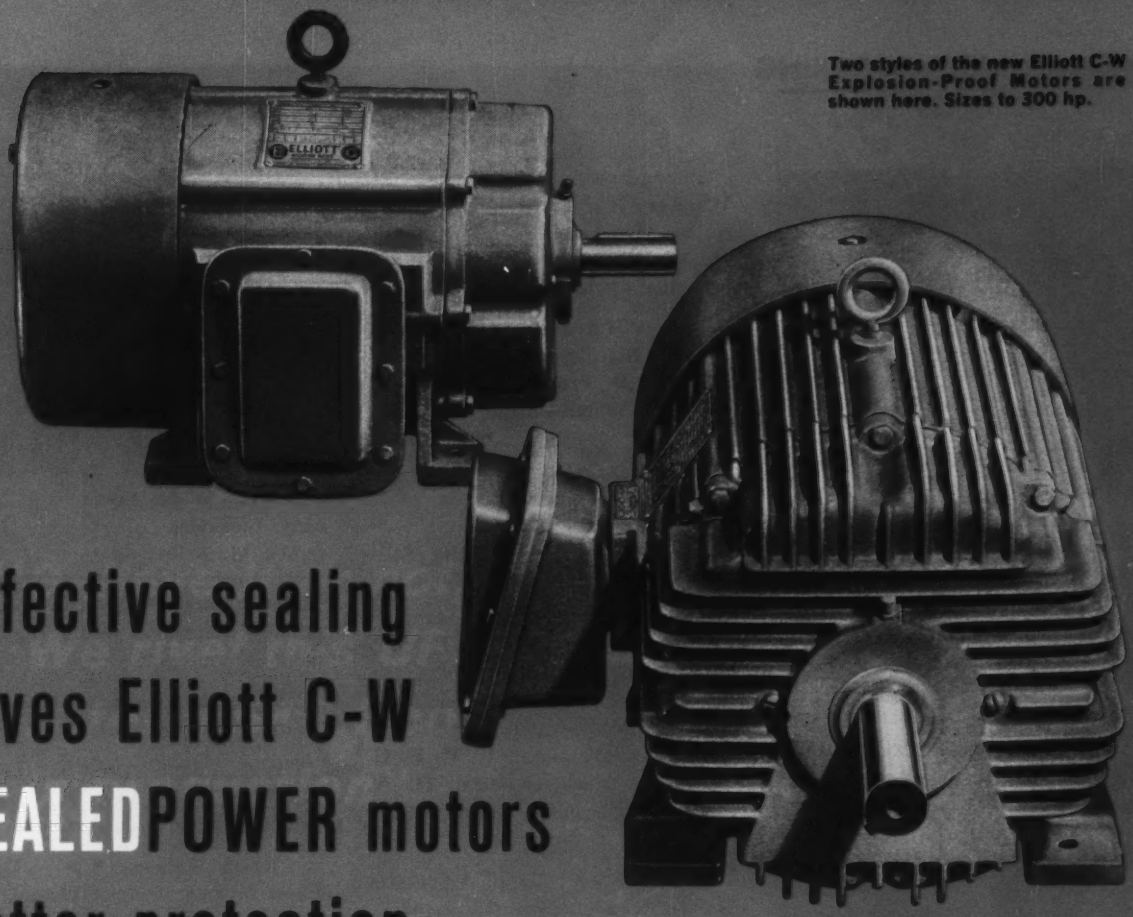
Division Acquired — Conveyor Systems, Inc., of Morton Grove, Ill., has acquired the Farquhar Division of the Oliver Corp. of York, Pa. Farquhar manufactures pre-engineered conveyors for the industrial and commercial fields.

Selling Division—The formation of a new corporation, Crane and Mill Sales, Inc., of Pittsburgh, a sales subsidiary of Morgan Engineering Co., Alliance, O., has been announced by the parent company. The new firm will market Morgan's line of heavy duty mill cranes, mills, and allied products.

Southern Plant—Formed Tubes, Inc., Sturgis, Mich., has acquired a subsidiary known as Formed Tubes Southern, Inc., to be housed in a newly constructed plant in Haleyville, Ala. The company makes welded steel tube products.

New Wire Mill — Great Eastern Wire Corp. has opened its new 20,000 sq ft wire drawing mill in Elizabeth, N. J. The one-story plant houses a complete wire processing operation from rod cleaning to wire drawing. Capacity of mill is 1200 tons a month in sizes from .005 in. diam to .375 in. diam.

Research in the West—Construction of the first phase of a new research and engineering center for Food Machinery and Chemical Corp. will begin about July 1. The building, which will be located at Santa Clara, Calif., will contain mechanical, electronic, physics, and materials processing laboratories, plus engineering and administrative offices.

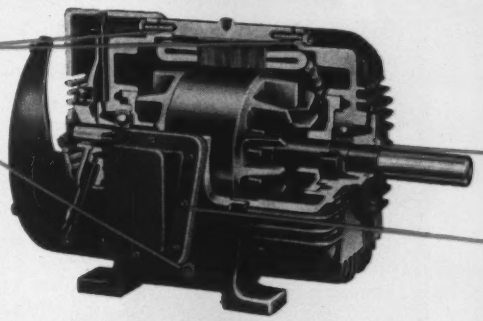


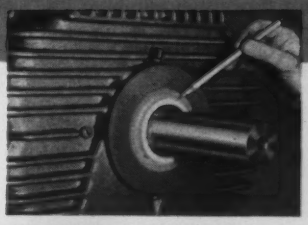
Two styles of the new Elliott C-W Explosion-Proof Motors are shown here. Sizes to 300 hp.

effective sealing gives Elliott C-W SEALEDPOWER motors better protection against moisture, dust, fumes, corrosion

LONG, SNUG BRACKET SEAL. Close-fitting, deep rabbet provides explosion-proof type seal for all SEALEDPOWER motors.

EASILY ACCESSIBLE, automatic breather and drain plug, underwriters approved, for removing internal moisture accumulations.



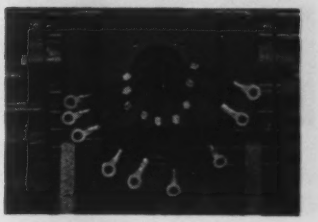


ROTATING SLINGER PREVENTS entrance of dirt and moisture through the bearing and shaft opening.

NO LEAKAGE HERE. Tightly sealed leads and opening. Metal-to-metal fit between conduit box, frame and cover.

NEW DATA on the complete line of Elliott C-W SEALEDPOWER motors is given in Elliott Bulletin PB 6000-2. Send for free copy today.

Elliott explosion-proof motor—underwriters approved.



ELLIOTT Company

Crocker-Wheeler Plant Jeannette, Pa.

W 9 3

J. W. Elbin, appointed vice president, manufacturing, AmForge Div., American Brakeshoe Co.

A. O. Smith Corp.—**N. F. Mullaney,** appointed manager, rail and advanced products, Automotive Div.; **W. P. Koth,** appointed assistant chief engineer, rail and advanced products group; **John Cherba,** named assistant sales manager, rail and advanced products group; **A. F. Smith,** named director, marketing; **Robert Stime,** appointed director, merchandising; **T. H. Creden,** named general manager, Tubular Div.; **Warren Hendricksen,** named general manager, Atomic and Process Equipment Div.; **H. D. Barnes,** named general manager, Space-Ordnance Div.

Pitney-Bowes, Inc. — **W. H. Wheeler, Jr.,** elected chairman of the board and chief executive officer; **H. M. Nordberg,** elected president and chief operating officer.

Stanley-Humason, Inc. — **F. R. Downs, Jr.,** elected vice president, sales; **P. D. Prudden,** elected vice president, manufacturing.

Electric Autolite Co. — **E. L. Pressel,** named manager, manufacturing engineering, Toledo Div.

New Britain Machine Co.—**R. T. Frisbie, Jr.,** elected executive vice president.

General Motors Corp.—Truck & Coach Div., **D. J. LaBelle,** appointed assistant chief engineer; **S. G. Little,** named director, Product Reliability Dept.; **R. E. Field,** appointed truck engineer; **H. N. Steinbaugh,** named administrative engineer.

Crucible Steel Co. of America—**T. J. Behan,** appointed manager, Buffalo sales branch.

Union Carbide Metals Co. — **G. W. Healy,** named senior research scientist.

Wean Engineering Co., Inc.—**R. L. Allshouse,** appointed sales manager.

Whitehead Metals, Inc.—**J. H. Miller,** elected comptroller and appointed a member of the management committee.

Mallory Metallurgical Co.—**P. L. Hotte,** appointed manager.

The Knickerbocker Co.—Truck-Man Lift Trucks Div., **E. W. Haskell,** appointed sales manager.

Ulbrich Stainless Steels—**R. E. Evasick,** named manager, distributor sales.

Midland-Ross Corp. — **T. F. Loughry,** appointed manager, foreign operations.

Eaton Mfg. Co.—**P. W. Olson,** appointed general manager, Marion Forge Div.; **G. R. Frye,** promoted to general manager, Foundry Div.

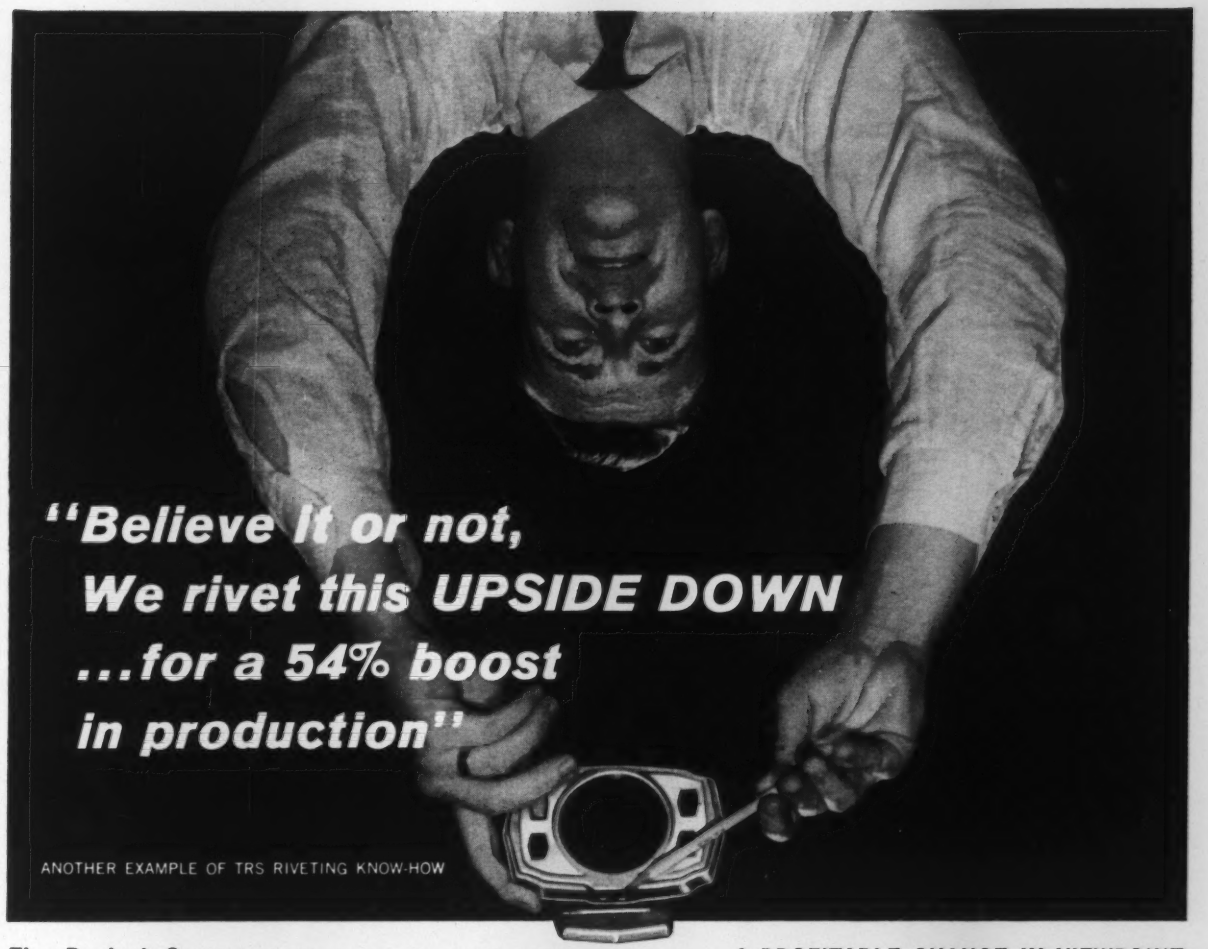
(Continued on P. 137)

H. E. Ehlers, elected executive vice president, Joseph Dixon Crucible Co.

W. A. Zimmer, elected executive vice president, Joseph Dixon Crucible Co.

J. R. Ferguson, Jr., appointed assistant vice president, design and construction, U. S. Steel Corp.

S. E. Wolkenheim, appointed vice president, marketing, Fairbanks, Morse & Co.



Ekco Products Company had been fastening wall brackets to their soap dishes and glass holders with solid aluminum rivets . . . hand-assembling the components and placing the assembly in a die which required two press strokes to fasten the parts. Production volume had reached a ceiling, and cost reduction was becoming imperative.

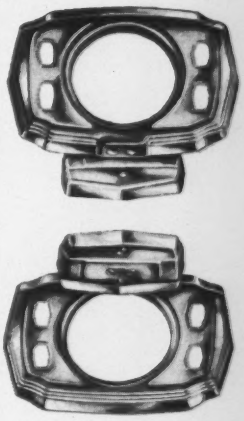
Automatic machine riveting, with semi-tubular rivets, would offer substantial savings, but obstructing flanges on the product itself seemed to rule it out . . . until the TRS man suggested a new viewpoint. Working with Ekco engineers, he proposed feeding the rivets upside down and inverting the assembly for the fastening operation, providing unobstructed travel for the rivet-setting driver. The rivets were kept with the heads visible, as required for good appearance.

Result: no hand assembly, daily output up 54%.

Let the TRS man look over your assemblies. You'll find that he has the viewpoint of a manufacturing engineer, and a knack for making fastening simpler, faster, better.

Of course he will recommend TRS rivets. But he will give you sensible reasons why they are more reliable in quality and uniformity. Superior quality control is one big result of a five-year modernization of this pioneer company — modernization of people, policies, production and service facilities. *You'll like to do business with the new TRS . . . we'll make sure of it.*

A PROFITABLE CHANGE IN VIEWPOINT



In the Ekco-Autoyre glass holder (shown) and soap dish, the rivet clinch must not be visible, but normal setting with the rivet heads on the visible surface was impossible because flanges on the product obstructed motion of the setting driver. To solve the problem, a semi-tubular rivet was designed with a flat head, to be fed and set in an inverted position with a TRS Model 103L machine. The end of the driver was shaped to form the clinch, and the machine was fitted with an air-operated pusher to eject the finished product.

Don't Buy Riveting Machines until you learn how the TRS **PAR** *process revolutionizes riveting*

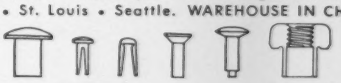
TRS

TUBULAR RIVET & STUD COMPANY

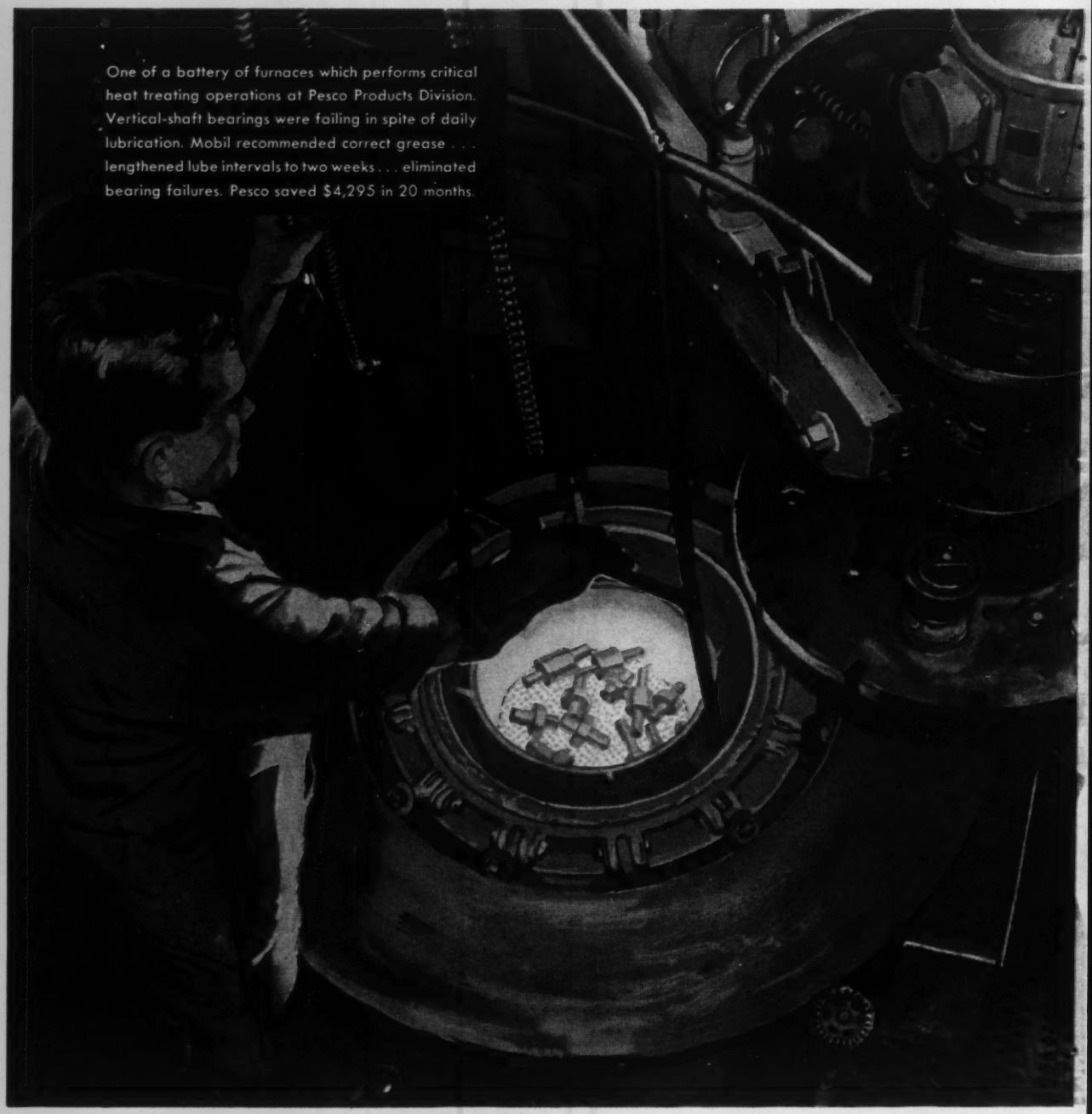
QUINCY 70, MASSACHUSETTS • TRS SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago Cleveland • Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York Philadelphia • Pittsfield • Quincy • St. Louis • Seattle. WAREHOUSE IN CHICAGO

See "Yellow Pages" for phone numbers.

If it's a Tubular Rivet TRS makes it . . . and Better



Pesco shows $11,735 saving



One of a battery of furnaces which performs critical heat treating operations at Pesco Products Division. Vertical-shaft bearings were failing in spite of daily lubrication. Mobil recommended correct grease . . . lengthened lube intervals to two weeks . . . eliminated bearing failures. Pesco saved $4,295 in 20 months.

Mobil Correct

with Mobil Program

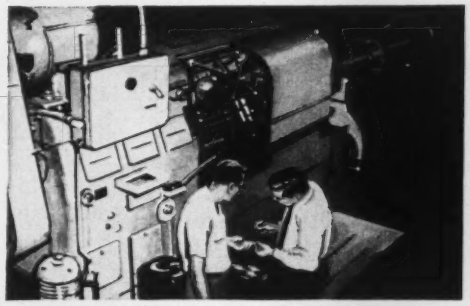
At Borg-Warner Corporation's Pesco Products Division, Mobil helps cut maintenance costs, increase production

Pesco Products ranks with the nation's foremost suppliers of components and systems for aircraft and space-vehicles . . . must maintain exacting product reliability and rigid schedules. To help meet these critical requirements, Pesco turned to a Mobil Program of Correct Lubrication.

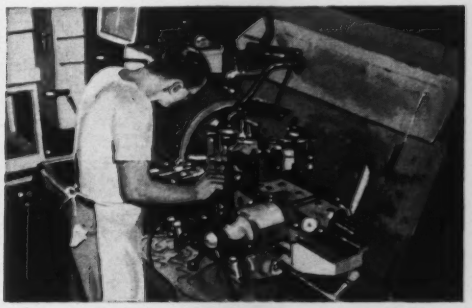
Mobil engineers began a program of analysis and study of Pesco maintenance and lubrication procedures in cooperation with Pesco personnel. The improved methods, schedules, and recommendations that resulted brought Pesco maintenance to a new standard of efficiency and economy. Special areas of assistance by Mobil included instruction of maintenance crews, lubrication charts and recommendations, and problem-solving in high-cost areas. In 20 months, the Mobil Program saved Pesco $11,735.

To find out how a Mobil Program may benefit *your* plant, write for an informative brochure. Or call your local Mobil representative.

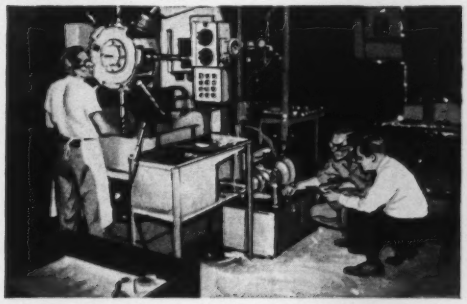
MOBIL OIL COMPANY
150 East 42nd Street, New York 17, N. Y.



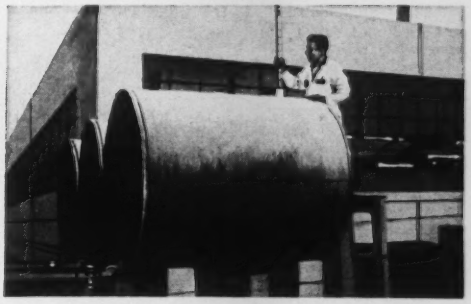
1. Sticking clutch plates on automatic screw machines posed costly maintenance problem for Pesco. Mobil traced the trouble to the oil used for machine lubrication . . . supplied a dual purpose fluid that eliminated the clutch problem, prevented loss of the cutting oil effectiveness as well . . . saved $3,528 in 20 months.



2. In Pesco's chucking department, lathes would not hold tolerance during the warmup because of oil characteristics. Mobil product eliminated the problem . . . saved Pesco $1,072 in lost production time. And on automatic chuckers, a Mobil hydraulic oil ended recurrent pressure losses . . . saved $1,960 in maintenance costs in 20 months.



3. On Pesco's hydraulic machinery, oil deterioration led to sticky valves, erratic operation, machine tool shutdowns. Mobil trained plant personnel in preventive maintenance procedures, recommended proper fluids . . . cut hydraulic maintenance by 40%.



4. Mobil studied Pesco's oil usage patterns . . . recommended bulk storage for certain petroleum products. Bulk delivery differential and reduced handling costs totaled $880 for Pesco Products Division in the first year alone.

Lubrication

Photograph by William Richards

WALT SICHA CASTS THE UNCASTABLE

If the fathers of today's foundrymen had looked at the blueprints for this aluminum impeller, their response would have been, "Impossible!" Neither alloys nor casting techniques of a generation ago were equal to such demands for quantity production of intricate shapes.

Then along came inquisitive researcher Walt Sicha. Over the years, Walt and his staff of 70 investigated thousands of experimental compositions. They've found about two dozen alloys that make today's casting possible—and economical. What's more, Walt says that if none of these fits your requirements, give him some time and he'll find another that does.

When they've picked the right alloy, Walt and his specialists will tackle technique. Because these men played leading roles in making aluminum casting commercially practical by every known method—sand, die, plaster and permanent mold—their counsel carries the stamp of authority and reliability.

Walt Sicha is representative of Alcoa's 762 research specialists, by far the largest staff of any light-metals company. These are the people who built the aluminum industry. Their continuing contributions are one more example of the added values we put into every pound of Alcoa® Aluminum you buy. Aluminum Company of America, 2018-D Alcoa Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM

helps you design it, make it, sell it

Alcoa has hundreds of Walt Sichas to help you design it, make it, sell it

All of Alcoa's skills are mobilized to a single purpose: To put more than just 16 ounces of metal in every pound of Alcoa Aluminum you buy. Here are 12 of the dozens of ways to do it:

1. Research Leadership, bringing you the very latest in aluminum alloys and applications.

2. Product Development by specialists in your industry and your markets.

3. Process Development Labs for aid in finishing, joining and fabricating.

4. Service Inspectors to help solve production problems at your plant.

5. Quality Control to meet top standards or match your special needs.

6. Complete Line including all commercial forms, alloys, gages, tempers.

7. Availability via the nation's best stocked aluminum distributors.

8. Foremost Library of films and books to help you do more with aluminum.

9. Trained Salesmen with a wealth of on-the-spot information.

10. Sales Administrators constantly on call to service your orders.

11. Year-Round Promotions expanding your old markets, building new ones.

12. The Alcoa Label, leading symbol of quality aluminum, to mark your goods.

Added Values With Alcoa Aluminum

. . . is a case book of Alcoa special services and a guide to their availability in design, manufacture and sales. Your copy, with some of the most rewarding information you may ever read, is waiting and it's FREE. Write: Aluminum Company of America, 2018-D Alcoa Building, Pittsburgh 19, Pa.

(Continued from P. 132)

Van Keuren Co.—**William Mark,** elected member of board of directors; **Donald Armstrong,** appointed assistant sales manager-field; **F. D. Clark,** named director, Thread Gage and Instrument Div.

H. A. Davis, elected president, Ardmore Products, Inc.

Dura Corp. — **E. S. Northup,** named assistant to the president.

Armco Steel Corp.—**R. E. Logan, Jr.,** and **J. R. Whitehurst,** named assistant credit managers; **G. E. Kauffman,** appointed assistant controller.

Kaiser Aluminum & Chemical Corp.—**F. R. Carpenter,** appointed manager, sales development, Kaiser Aluminum International.

Armco Steel Corp. — **G. E. Kauffman,** appointed assistant controller.

Samuel Naismith, named assistant vice president, facility planning, U. S. Steel Corp.

(Continued on P. 140)

A Message to Executives Seeking a New Plant Site

Check these 3 Important Plant Location Advantages in

PENNSYLVANIA

100% financing for your new plant

Complete financing on lease-purchase plan—low interest rate—deferred amortization. Plant "shells" now being readied for completion. Inspection welcomed.

Excellent "tax climate"

No state personal income tax—no machinery or inventory taxes—no graduated state tax rates—no direct state property tax—manufacturing activities in Pennsylvania are exempted from capital stock, franchise, and sales taxes.

Plant location services

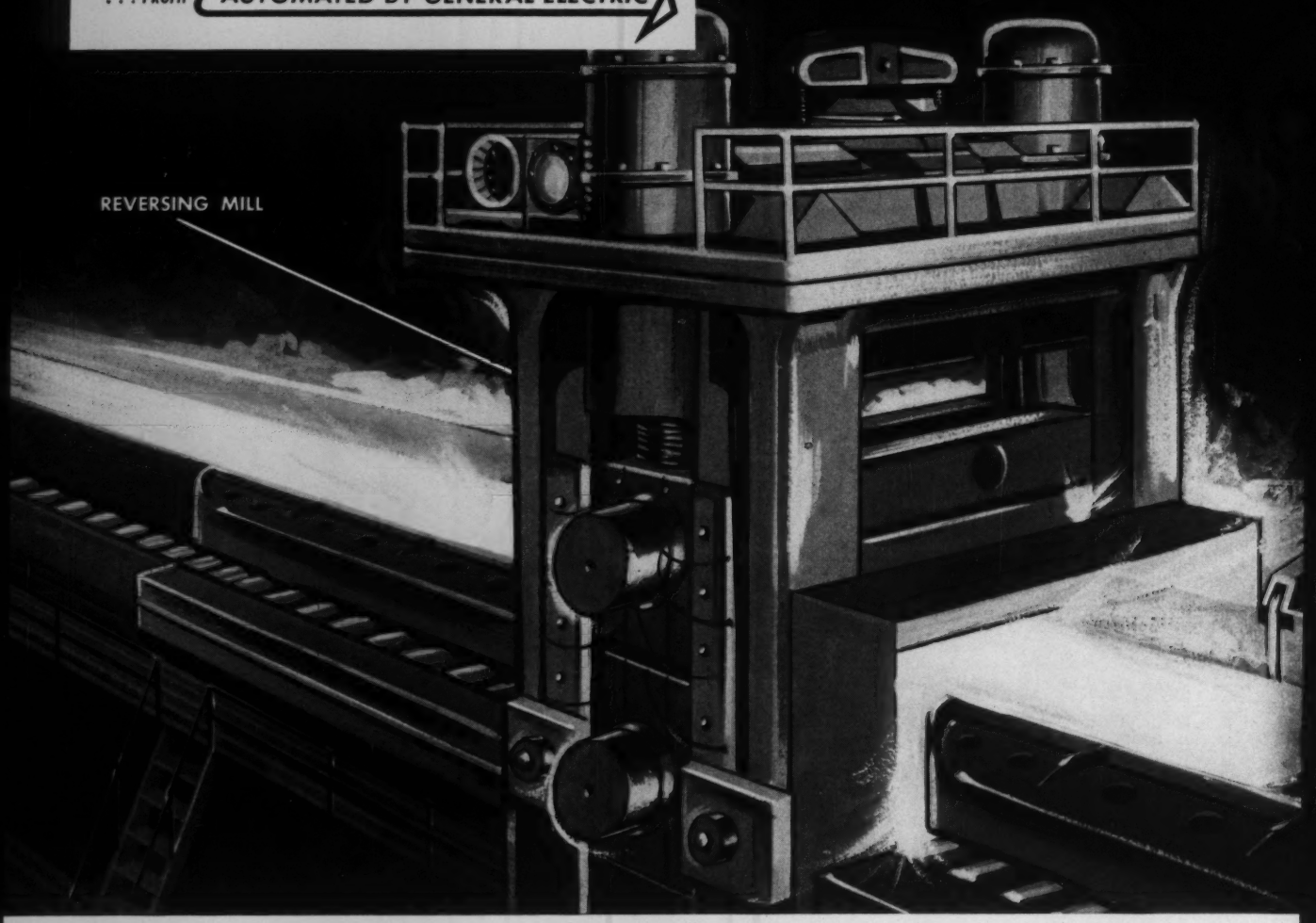
Staff specialists available to serve industry, engineering firms, management consultants, industrial realtors and others with fully detailed plant location data.

For free copy of pamphlets on these Pennsylvania Plant Location Advantages, write or call:

PENNSYLVANIA DEPARTMENT OF COMMERCE
South Office Building
761 State Street, Harrisburg, Pa.
Phone: CEdar 4-2912

FOR QUALITY... PRODUCTIVITY ... PROFIT

METAL ROLLING AUTOMATED BY GENERAL ELECTRIC



A NEW CONTROL FOR REVERSING HOT MILLS

G-E program-control system operates

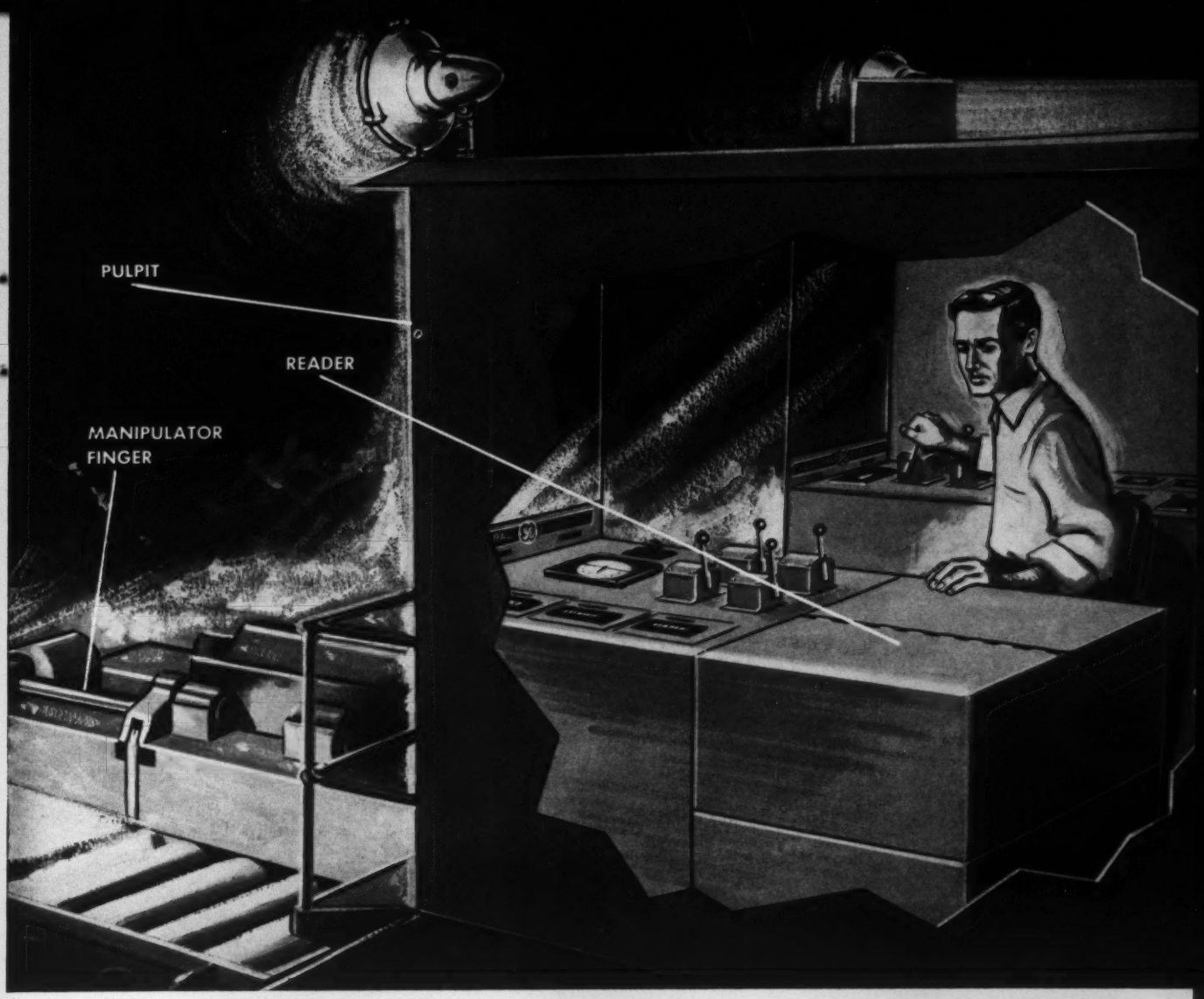
General Electric's new program control for reversing hot mills performs an entire rolling cycle—automatically. Increased yield per ingot, substantially improved product quality and reduced unit cost are outstanding advantages of this new control system.

HOW G-E PROGRAM CONTROL OPERATES

The entire rolling operation, from ingot entry to finished slab, is controlled automatically. A punched card or other memory device is used for data storage and to control the entire operating sequence.

The cards are punched to perform mill functions previously determined to be the most efficient for the equipment involved and the product desired. This controlling element is read by an industrial card reader, which sends impulses to the control circuit and on to the screwdown motors, mill table drives, and manipulator drives. The operator, seated in the pulpit, inserts the card into the reader, depresses a pushbutton, and then the control directs the entire operating sequence. The speed of the mill table, position of the rolls, manipulation of the piece, and sequencing operations for all passes are controlled automatically by the program control system.

Yield is increased—The General Electric program control schedules the mill tables to run at the most desirable and efficient speed. It also brings the rolls into the position calculated for maximum ingot reduction on each pass and turns the ingot at the exact time determined to produce highest slab quality. This precision control produces more finished slabs per turn than manually controlled mills.



entire rolling cycle — automatically

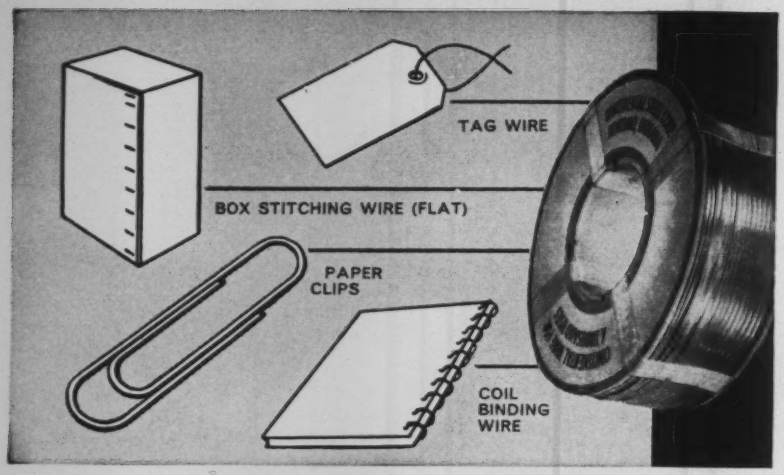
Quality is improved—Greater slab uniformity is obtained with G-E automatic program control. Consistent roll settings and mill speeds produce uniform slabs. This improved quality control also results in substantially less scrap.

Unit cost is reduced—Automatic programming produces finished slabs faster than ever before possible. Higher operating efficiency of machinery and faster equipment adjustment by automatic control cut production time—therein reducing unit cost.

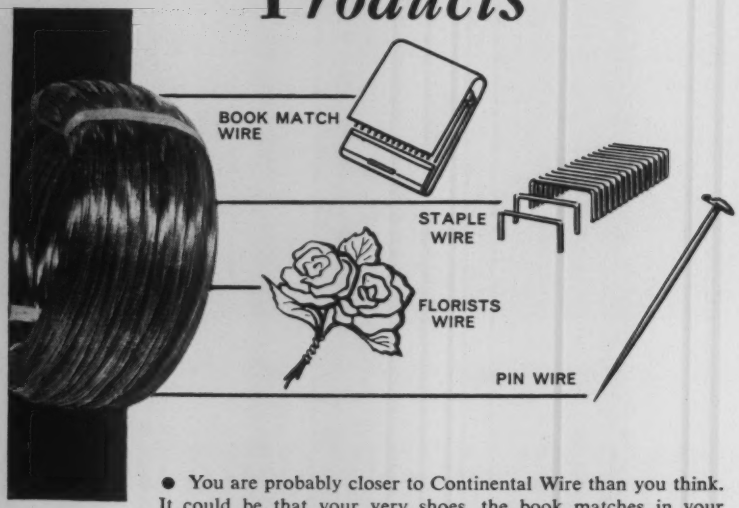
Get all the facts on this new automatic control for steel mills. Contact your G-E Apparatus Sales Engineer today, or write to Sect. 785–10, General Electric Company, Schenectady 5, N. Y., for bulletin GEA-6869. Industry Control Department, Salem, Virginia.

Progress Is Our Most Important Product

GENERAL ELECTRIC



Fine and Specialty Wire for Super Fine Products



● You are probably closer to Continental Wire than you think. It could be that your very shoes, the book matches in your pocket or the paper clips in your desk—were made using dependable Continental Fine Wire! That's because Continental is preferred by hundreds of leading firms for literally thousands of different fine wire applications. For super fine products—you, too, should try Continental Fine and Specialty Wire, available in many sizes, of almost any temper, finish or analysis, in low carbon and medium low carbon steels.

For the finest in fine wire—call in Continental!

CONTINENTAL

STEEL CORPORATION • KOKOMO, INDIANA

Wire Specialists for over half a Century

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

(Continued from P. 137)

Colorado Fuel and Iron Corp.—**R. H. Hertzog,** named chief product engineer, wire and cold-rolled steel products, John A. Roebling's Sons Div.

H. R. Beachler, appointed manager, tubular production, National Supply Co.

National Steel Corp. — **W. A. Shelby, Jr.,** named assistant to vice president engineering.

Weirton Steel Co.—**C. H. McConnell,** named assistant to the vice president of sales.

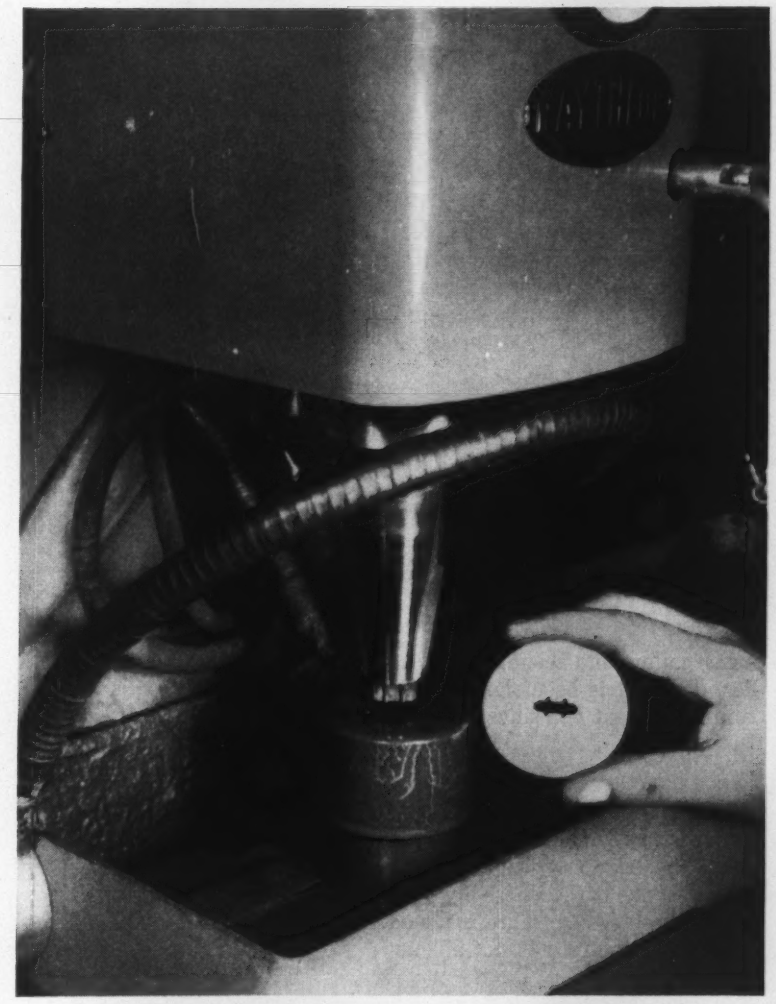
Westinghouse Electric Corp. — **R. A. Irwin,** appointed director of space activities.

Cincinnati Milling Machine Co., Cincinnati Milling Products Div.—**D. D. Black,** appointed assistant sales manager.

W. L. Moore, appointed director, commercial research, Jones & Laughlin Steel Corp.

Ultrasonic Machining calls for ultra-modern abrasive

. . . NORBIDE boron carbide*



The Raytheon Company, a leading manufacturer of ultrasonic machine tools, recommends NORBIDE abrasive grain as the ideal cutting agent for ultrasonic grinding applications. Ultrasonic Machine Tools convert electric current into mechanical vibrations at rates up to 25,000 cycles per second, and drive abrasive against the work with an impact force 150,000 times the abrasive's own weight. In so doing they can machine an exact counterpart of the shaped tool face into the workpiece, as shown here.

With the tremendous increase in the demand for accuracy beyond the range of conventional machining, Norton NORBIDE abrasive is a vital aid to the exceptionally high precision performance of modern ultrasonic machine tools.

NORBIDE boron carbide grain is second only to diamonds in hardness. Compared to silicon carbide grain, it provides the same degree of finish, but being less friable maintains size and speed of cut for a much longer period of time.

Ultrasonic machining is of major importance in the electronics and metalworking industries, as well as in the manufacture of intricate jewelry and fine glass and laboratory ware. Materials machined include alumina, carbon blocks, ceramics, diamonite, ferrite, germanium, granite, graphite, silicon, tungsten, mother-of-pearl, sapphire, tool steel, carbide and other alloys. Operations include shaping, slicing, trepanning, engraving, cutting of intaglios, dicing, drilling and multi-drilling. In all applications, on all materials, NORBIDE abrasive grain is essential to high precision, sharp-edge accuracy without chipping, distorting or otherwise damaging the workpiece.

Your Norton Man can give you details on how ultrasonic machining with NORBIDE abrasive may improve and economize your production. See your Norton Distributor or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON

BORON CARBIDE

G-390

75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

GRANODRAW SS Lubricant Base 300%, Cuts Heating Costs

Amchem Process Protects and Improves Surface Finish of Stainless Tubing

A 4000-gallon Granodraw SS operation is saving time and equipment, cutting costs and improving quality of stainless stock prior to drawing and reducing at Wallingford Steel—one of the world's largest producers of welded stainless steel tubing. In addition, Amchem Serseal chemical blanket has lowered heat costs, improved working conditions around the bath.

PRODUCTION TIME SAVED

Providing an excellent lubricant base, Granodraw SS has achieved an increase of 300 percent in drawing speeds at Wallingford's stainless tube reducing mill. Easily maintained and extremely stable, the Granodraw SS bath is left standing over a weekend, yet starts immediately in trouble-free operation for Monday morning operations!

VALUABLE EQUIPMENT PROTECTED

By preventing galling and seizing, and metal to metal contact between work and the dies, die life has been significantly increased. Drawing loads are between 20 and 25 percent less since use of Granodraw SS was instituted.

HEATING COSTS REDUCED

In conjunction with Granodraw SS, the Serseal chemical blanket for drawing operations has racked up additional savings in heat—up to 80 percent!—for Wallingford. With the bath effectively contained by Serseal, working hazards are reduced, corrosive effects are lessened on surrounding equipment—yet efficiency of the oxalate bath is not affected.

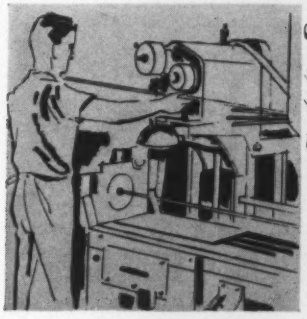
SURFACE FINISH IMPROVED

The Granodraw SS oxalate coating reacts with the metal surface, leaving a hard, spongelike deposit to which lubricants readily cling. As the stainless passes through the die, the lubricant melts and recrystallizes absolutely evenly —a sure sign of uniform, friction-free lubricating action and improved surface finish quality.

If your operations involve stainless tubes or wire drawing, cold heading or impact extrusion—find out how Granodraw SS can save you time, equipment and money while boosting product quality!

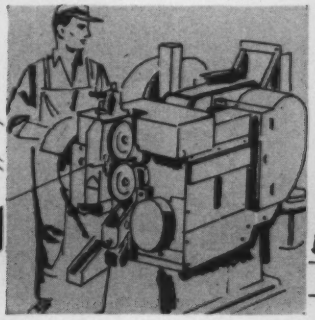
Increases Drawing Speeds and Rejects at Wallingford Steel!

Stainless tubing prior to immersion in Granodraw SS bath at Wallingford Steel. Note absence of steam vapors and fumes, overall cleanliness of operation obtained by use of Amchem Serseal, new heat-reducing chemical blanket.

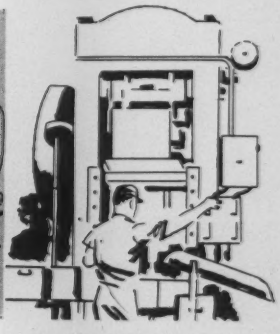


TUBE DRAWING

WIRE DRAWING



COLD HEADING



IMPACT EXTRUSION

Write for your copy of Bulletin 1437 on Granodraw processes, and further information on Serseal—two of the many Amchem chemicals for the metalworking industry.

AMCHEM GRANODRAW SS

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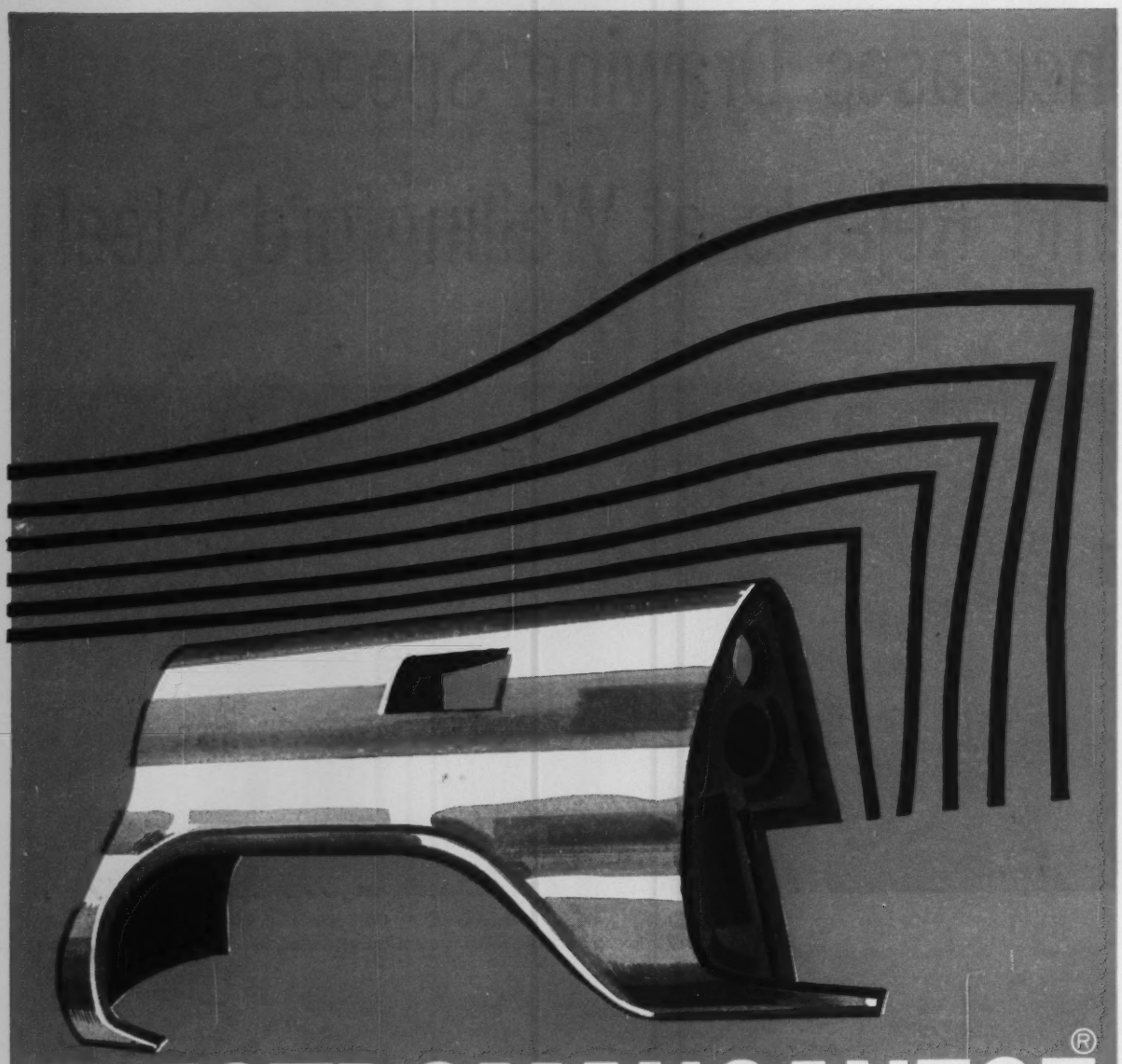

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Carbon, silicon, and other impurities rob deep drawing steels of their strength and stretch. Protect the quality of your steels by using pure manganese—ELECTROMANGANESE. Get facts and prices by writing for Bulletin 201 to Technical Literature Section, Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa., or Box 479, Knoxville 1, Tennessee.

Careful Electrode Choice Vital to Good Welding

Competition is keen among American manufacturers of welding electrodes.

The user gets high quality at a low price. Many companies know that the right electrode on the job spells profits.

By R. R. Irving,
Associate Editor

■ Users of welding electrodes have their own jargon. They refer to "sixty-ten" or "poor fit-up rod" or "the hot rod." To the fabricator, these terms have a real meaning.

The lion's share of all arcwelding done today is carried out with a handful of mild steel electrodes. As a group, they are responsible for joining the plain carbon steels. Some of them can weld the more difficult alloy steels.

Even though industry consumes these electrodes in enormous quantities, it is misusing them right and left. Of course, many of the big companies not only know what they're doing but they keep abreast of all the developments.

Nevertheless, for every alert company, there are dozens of smaller setups wasting management's dollars.

Workhorse—The old reliable "stick" electrode still accounts for about 85 pct of all arcwelding done today. You hear a lot about recent advances in automatic welding. But just as much is going on in the stick electrode field.

Simplifying the picture, most common electrodes belong to one or more of three basic groups. Each group can be identified by its coating. The oldest in point of service (and still in the most popular) is the "organic and rutile" group. Here, you'll find E6012, E6010, E6013 and E6011.

Bridging the gap between this first group and the "iron powder" group is a single electrode, E6020. This is "the hot rod." It has an iron oxide coating. And its main asset is speed.

Closing the Gap—The iron powder group includes E6014, E6024 and E6027. These electrodes were introduced within the past decade. They are gaining in popularity every day.

During World War II, users were

WELDING SHOW

Great Western Exhibit Center, Los Angeles, April 26-28. To be held with AWS 41st Annual Meeting, Biltmore Hotel, April 25-29.

A. O. Smith Corp.

ARCWELDING: Few metalworking tools have the all-around versatility of arcwelding. This includes mass production and repair jobs.

The Lincoln Electric Co.

NO JOB TOO TOUGH: Get a trained welder in a tight spot and you'll have yourself a good weld, even in pipeline jobs.

Spec Knowledge Helps

ELECTRODE	TYPE OF COATING	CURRENT
EXX10	Organic	dc+ only
EXX11	Organic	ac or dc+
EXX12	Rutile	ac or dc−
EXX13	Rutile	ac or dc−
EXX14	Rutile, Iron powder	ac or dc±
EXX16	Low hydrogen	ac or dc+
EXX18	Low hydrogen, Iron powder	ac or dc+
EXX20	Iron Oxide	ac or dc±
EXX24	Rutile, Iron Powder	ac or dc±
EXX27	Mineral, Iron Powder	ac or dc±

TABLE I: The last two digits in an AWS-ASTM electrode specification show the type of coating and the currents you can use.

concerned about cracking in certain welds. Cracking was traced to too much hydrogen in the weld itself. So a new coating was developed to prevent an excess of hydrogen from forming in the welds. It was aptly nick-named "the low-hydrogen electrode." E7016 heads this group in total sales.

To combine the benefits derived from "iron powder" and "low hydrogen" coatings, another type was finally developed. The most widely used electrode in this iron-powder low-hydrogen group is E7018.

Confused? — Many uninformed users are baffled by such "code talk." Will it help the user, for example, to know what E6012 means? It certainly will. The American Welding Society has spent a great deal of time putting these numbers together with one goal in mind: To make electrode selection that much easier for industry.

The explanation of E6012 is quite simple. The letter "E" just means it's an arcwelding electrode. Consider the first two digits, in this case 60, as a single unit. From this, you know that the tensile strength of your weld will be at least 60,000 psi.

The third digit relates to welding position. A "one" means you can weld in all positions (flat, horizontal, vertical and overhead). If the third digit is "two," then you're restricted to welding in the flat position and for making horizontal fillet welds. A "three" in the same slot keeps you in the flat position only.

The last two digits together indicate current and type of coating. Table I covers this in more detail.

Number One—The "poor fit-up" electrode, E6012, still leads the pack in total sales. But several iron-powder wires are cutting into its volume. Single-pass welds with this electrode usually pass X-ray requirements. But don't expect the same quality in multi-pass welds.

In vertical and overhead work, try a size smaller than you would normally use in E6010 and E6011. E6012 will give good speeds and will take high currents, especially on single-pass horizontal fillet welds.

An old stand-by of the pipeline welders is E6010. It can be used only with direct current reverse polarity, not alternating current. Nevertheless, single-pass welds with this electrode give X-ray quality. This is even true in vertical and overhead positions.

E6010 has an arc that penetrates deeper than the others. And, in some instances, it can be applied to galvanized plate and certain low-alloy steels. It's a must in such industries as shipbuilding, bridges, buildings and storage tanks.

Third in sales is E6013. This one gives shallow penetration. It replaces E6012 in the 1/16 through 3/32-in. diam range. Another instance where it replaces E6012 is in "vertical down" welding. Its prime use is in sheet metal work.

What do you do when you want

E6010 quality but all your equipment is for alternating current? Then your best bet is E6011. Although it does not perform quite as well as E6010, it is the closest ac counterpart.

Faster Output—Two electrodes, E6024 and E6027, are so similar that they're mentioned in the same breath. As a unit, they're the fourth most popular electrode behind E6013. Associate one trait with these electrodes: Speed.

E6024 is the iron-powder equivalent of E6012 and E6013. Of course, you can't weld in the vertical or overhead positions with this electrode. But no other electrode can match its speed in horizontal work. If you want X-ray quality in your high-speed welds, switch to E6027, the iron-powder counterpart of E6020.

When in Doubt—There are many grades of low-hydrogen electrodes. But only one of them, E7016, enjoys wide use with plain-carbon steels. In sales, it's between the iron powder types and E6011. The old saying, "when in doubt, use low hydrogen," is one reason that its sales are so high.

Actually, E7016 takes over where the standard electrodes leave off. Cail its main applications the "hard-to-weld" steels, where strength or carbon or alloy content is high. Its as-welded properties are even better than E6010 and E6011. But it also costs a few cents more.

Of the newer electrodes, two are definitely worth watching. They are E6014 and E7018. The former is an iron-powder type that can be used in all positions. It bridges the gap between E6013 and E6024. E7018, on the other hand, will do anything that E7016 will do, only faster.

Standard Question—Why do the manufacturers make so many different kinds of electrodes? One electrode might be the last word for overhead welding but just "so-so" in "vertical up" work. So another is developed that shines in the latter position. That's why one manufacturer will make as many as five electrodes to fill a single AWS specification.

Sometimes a foreman complains: "Our welder says those low-hydrogen rods you sent over last week don't run right. How come?"

Nine times out of ten the welder

How Electrodes Compare

WELDING POSITION	EXCELLENT	VERY GOOD	GOOD	FAIR	NOT RECOMMENDED
Flat	E6020 E6024 E6027	E6014 E7018	E6013 E7016	E6012 E6010 E6011	
Horizontal, single pass	E6014 E6024	E6020 E6027	E6012 E6013 E7016 E7018	E6010 E6011	
Horizontal, multi-pass	E6010 E6011	E6012	E6013 E6014 E7016 E7018		E6020 E6024 E6027
Vertical Up	E6010 E6011	E6012	E6013 E6014 E7016 E7018		
Vertical Down	E6010 E6011	E6012	E6013		
Overhead	E6010 E6011	E6012	E6013 E7016 E7018	E6014	
GENERAL PERFORMANCE					
Penetration at normal current	E6010	E6011	E6020 E6027 E7016 E7018	E6012	
Melt-Off at normal current	E6012	E6024	E6020 E6027	E6013 E6014 E7016 E7018	
X-ray Quality	E6020 E6027 E7016 E7018	E6010 E6011	E6013 E6014	E6012 E6024	
Versatility	E6010 E6011	E6012 E6013	E6014 E7016 E7018	E6020 E6024 E6027	

Air Reduction Sales Co.

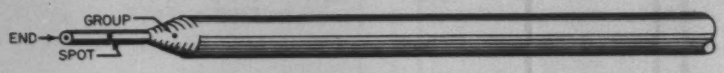
FIELD WELDING: Simultaneous arcs hasten the welding of structural members. Iron-powder electrodes make the job even faster.

Hobart Bros. Co.

PROPER STORAGE: Nothing beats systematic storage of electrodes. Good stock control means less chance for costly downtime.

Know Them By Their Color

	COLORS		
ELECTRODE	END	SPOT	GROUP
E6010	None	None	None
E6011	None	Blue	None
E6012	None	White	None
E6013	None	Brown	None
E6014	Black	Brown	None
E6020	None	Green	None
E6024	Black	Yellow	None
E6027	None	Silver	None
E7016	Blue	Orange	Green
E7018	Black	Orange	Green



didn't follow the unwritten law of low-hydrogen electrodes. Never expose them to normal temperatures longer than one working shift.

Information, Please—"We're trying to bid on a big job, but they tell us that our welders have to be certified. Who does this kind of work?"

Don't look for a simple answer to this one. Find out where this job is going. Is it the government? If so, what branch of the government? If it's industry, find out what agency is involved.

Are you using the right electrode? A slightly more expensive wire might reduce your overall fabrication costs. Then again, you might be using an expensive one when a cheaper electrode will do just as well.

Choose a reputable source of supply. Don't under-estimate this company's salesman. He's been around. Chances are that he's seen your problem more than once.

Many shops can look upon electrodes as the life-line of their production. So it becomes that much more vital to keep tabs on your electrode supply. Don't let talk of price changes alter your buying habits. Instead, use a system of inventory control that insures an adequate stock of the popular grades.

Intelligent users maintain a safe stock-pile of electrodes. In this way, they prevent any last minute panic in the purchasing department. Production continues at a normal rate.

Keep Them Dry—Storage is important, too. Store them indoors, if possible. Make sure that the site you choose remains within a sensible temperature range throughout the year. If you do use electrodes that come in hermetically-sealed cans, only open those cans you are certain to consume within a single working shift.

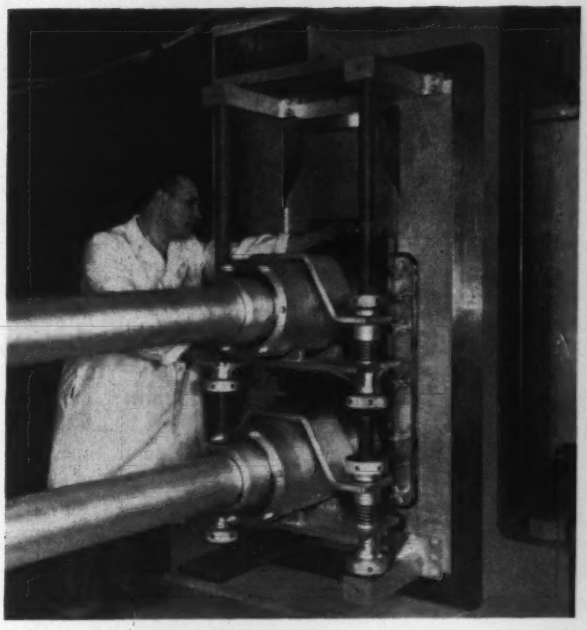
The price per pound for mild steel electrodes is fairly cheap. And the quality is high. You are getting your money's worth. And remember that the cost of electrodes is very slight compared to overall welding costs.

How About Current? — A few tips to the novice. A new shop should investigate alternating rather than direct current. If your shop has both types, keep the ac lines open for the larger diameter electrodes (3/16 in. and up). Or you can restrict dc welding to any operations that require less than 200 amp.

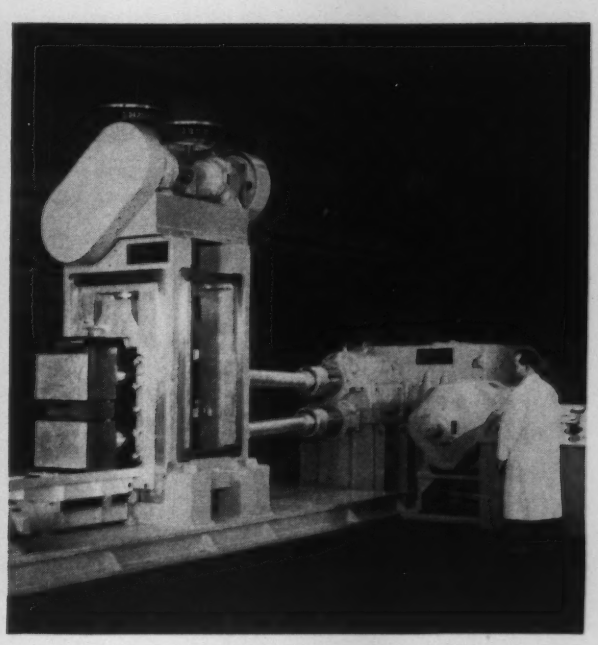
Unless your welding operation falls under the select few, you had best do some soul-searching. Is there enough welding going on at your plant to warrant a trained specialist?

Arcwelding is a science. Don't treat it lightly. Think of it this way: If one man can increase your output and decrease your costs, wouldn't he be worth the added payroll expense. It's time your company learned the facts of arcwelding life.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



FROM THE REAR: At rear of rolling mill stand, 3-in. and 14-in. four-high rolls are set in position.



REMOTE CONTROL: Combination mill for rolling plutonium functions inside glove-box enclosure.

Rolling Mill Works Plutonium

A new remote-controlled mill is set up to roll plutonium for the AEC.

It'll be ready to cope with demands of future nuclear programs for the toxic element.

■ A test station is rolling plutonium with an unusual remote-controlled rolling mill. It's a long range project with a peacful goal: Plutonium as a fuel for nuclear reactors.

The rolling mill is in service at the Hanford Works, Seattle, a plant that General Electric Co. operates as prime contractor for the U. S. Atomic Energy Commission. Name of the project is the Plutonium Recycle Test Reactor (PRTR).

The first fuel loading for the reactor will consist of 85 elements. Twenty-five of these will contain plutonium fuel in the form of plutonium-aluminum alloys. The remaining 60 elements will contain uranium oxide.

Safe Rolling—A mill to roll plutonium has to be remotely controlled due to the element's high toxicity. Plutonium dust is so toxic that its content in air must not exceed 7×10^{5} micrograms of air.

To prevent plutonium from oxidizing in air, the metal is processed in an argon atmosphere. This being the case, the rolling unit is enclosed within a fabricated steel hood or glove box. Rubber-glove techniques will be used to operate the mill.

Three Jobs — The manufacturer of the mill, Loma Machine Mfg. Co., Inc., New York, has supplied three roll sets to handle three vital jobs. One set will be used for hot working flat materials up to 1700°F. These are two-high breakdown rolls—14 x 20 in.

Cold working of similar materials will be done by four-high finishing rolls—3 x 14 x 20 in. The third area (hot working of shapes in gothic passes from 2 to ½ in. diam.) will be performed by two-high grooved rolls. These rolls are 14 x 20 in.

Savings—By using interchangeable roll sets, Hanford engineers will be able to do the work without employing separate mills for each job. More conventional methods of tackling these same jobs would require at least four individual mills.

The mill is driven by a 100-hp G.E. "speed variator" set. The set includes a dc mill motor, a motor generator, operator console and control equipment. The drive offers constant horsepower traits from 42 to 24 fpm. The drive's constant torque provides a range from 24 fpm to creeping speed.

A feature of the mill is a power-operated device that changes rolls. This device removes and replaces rolls within the glove-box area.

Stacking Frames Feed Castings Through Production Stages

By Leo Pudup—Supervisor, Machine Design, Rochester Products Div., General Motors Corp., Rochester, N. Y.

A sequence of drilling, milling and tapping of iron castings can present a real headache.

Stacking frames speed these operations and reduce handling.

▪ Simple stacking frames speed gray-iron castings through two transfer machines. The first machine feeds castings to single-stage work stations. Final machining takes place in the second transfer unit. This machine handles castings in pairs.

The castings, machined in volume by the Rochester Products, Div., have two throat openings for butterfly throttle valves. These castings are commonly called throttle bodies.

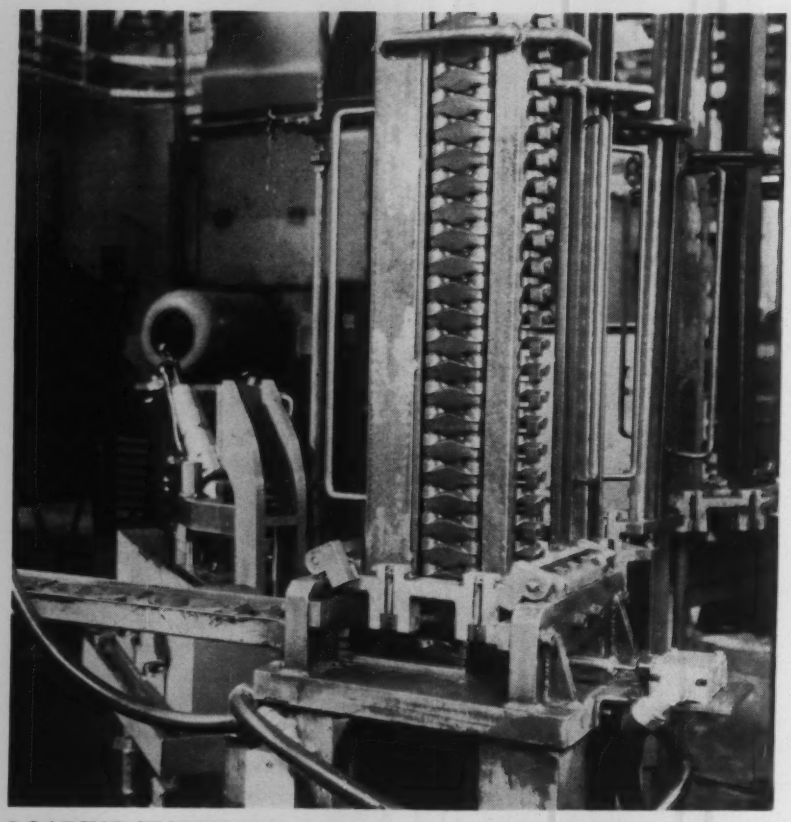
Milling machines produce flat faces on the castings—before they pass through the transfer units. Drilling, reaming and tapping occur at various stations in the transfer machines.

Storage Banks — Milling output varies from machine to machine. Therefore it's necessary to have reserves or banks of castings available for each transfer unit. And, since the second-stage transfer machine feeds parts to stations which handle two castings at the same time, special banking is essential.

An unusual stacking setup provides the banks needed. This setup also eliminates a lot of manual handling after the castings leave the milling stages.

Workers remove the castings from the milling machines and place them in a channel. The channel feeds the castings to a stacking frame.

Stacking takes place automatically. An incoming casting pushes onto the loading stand's bed. When it's directly under the stack, it trips a limit switch.



LOADING STATION: Incoming part trips a limit switch. The switch activates a hydraulic ram which lifts the casting up and into the stack.

Quickly Stacked—The limit switch activates a solenoid valve. This valve admits fluid to a hydraulic cylinder, located below the stand. As the cylinder moves up, it lifts the entire stack of castings—including the incoming part.

Moving upward, the incoming casting displaces latches that support the castings already in the stack. These latches click back to support the newcomer and the entire stack. At this point, the ram reverses to its original position.

The loading operation automatically repeats itself until the frame is filled. Each frame holds 75 castings and is supported at the top on a trolley. All frames move around on loop-like tracks.

Separate tracks serve each transfer machine. Each track supports 18 frames. This arrangement banks a total of 1350 castings in each storage loop. Since the loops are small, the set of racks in each loop

requires little floor space. Each loop also swings close to loading and unloading points.

Locks Secure Frame—A worker manually advances a stacked frame along its supporting loop. An empty frame replaces the displaced member.

Gates prevent castings from advancing onto the loading bed—unless a frame is in the loading position. The filled frame passes through the stacker and moves to the loading station of the first transfer machine. Locks secure the stacked frame in position.

A walking-beam transfer bar indexes the castings to each station as the transfer unit cycles. When the bar reaches the back position of each cycle, a casting automatically moves from the stack onto the bar.

After the entire frame unloads, a worker moves a loaded stack over to replace the empty frame. In all other respects, loading of both transfer machines is completely automatic.

Feed Dual Stations—As castings feed out of the first transfer machine, they move along to a second stacking station—above which is another stacking frame. This frame, one of many making up the second loop, loads in exactly the same manner as the loading station on the first loop. After a frame fills, it moves along the second loop.

The frames feed the second transfer machine in the same manner as the first. But, since the second machine handles the castings in pairs, they feed into dual fixtures—two at a time.

Dual racks, placed in tandem, feed the dual fixtures. The dual racks move into position along a single loop. One casting feeds out of each rack onto the transfer bar at the loading station.

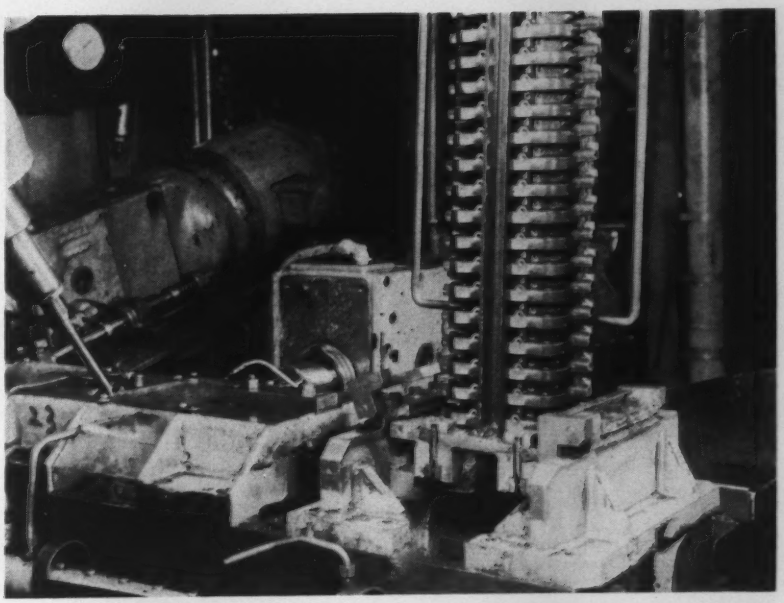
When both racks are empty, they're pushed along the loop. Two stacked racks, on the same loop, replace them.

Into the Washer—Castings coming from the second transfer unit need no further machining. As finished parts, they require no stacking. The second transfer machine places the finished parts on a belt conveyor.

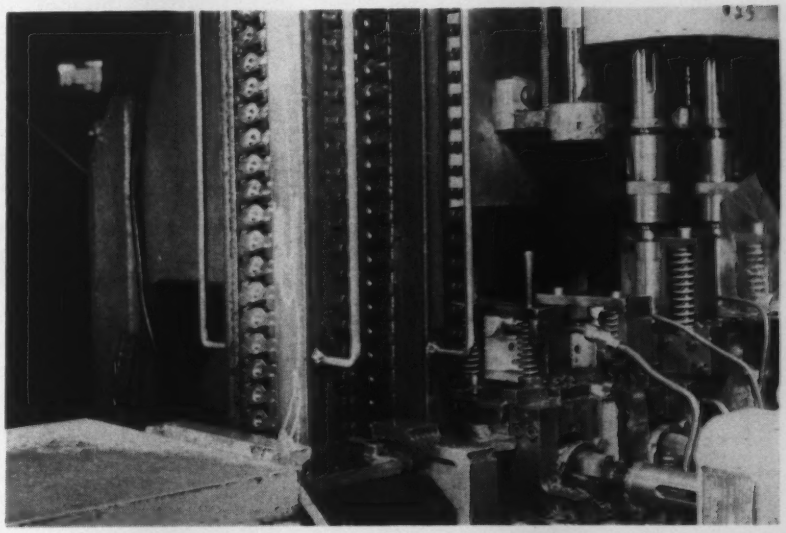
The belt carries the parts to a washer. After washing, they're ready to enter the assembly department. Simple tote boxes facilitate the castings' movements at this point.

Normally, castings aren't handled individually from the time they leave the milling machines until they're discharged from the second transfer machine.

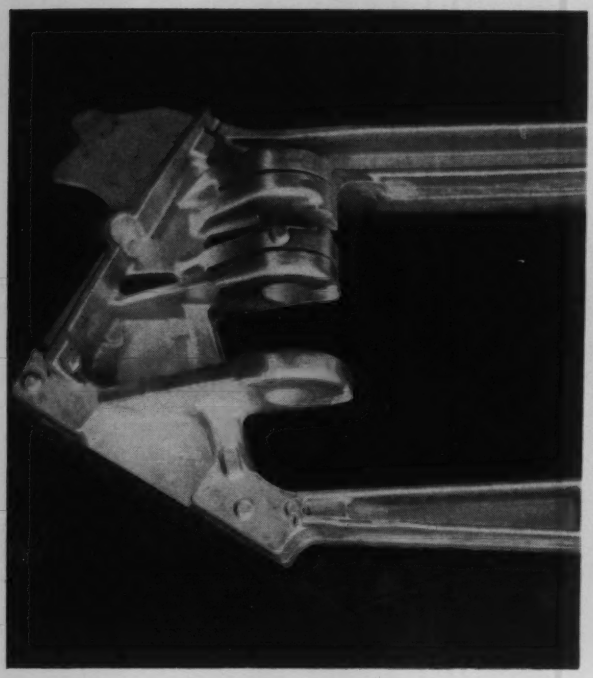
A single operator tends both transfer units. He swings filled frames along the loops to the machines' loading positions. He moves the unloaded frames along the loops back to the stacking positions. All movements require little effort because a free-running trolley supports each rack.



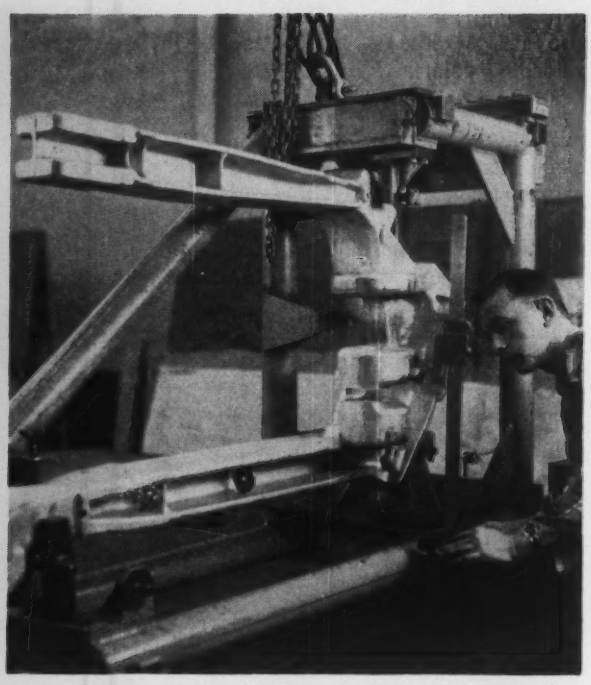
END OF LINE: At the end of the first transfer machine, the partially finished castings automatically feed into another stacking frame.



DOUBLE STACK: A pair of frames hold castings received from the first transfer unit. Unloading advances two castings to each work station.



COMPLEX FORGING: Very low-draft angles allow thin-web sections to withstand very high stresses.



FINAL CHECK: Operator checks final dimensions of finished aircraft-landing-gear trunnion forging.

Nondestructive Tests Check Out Aluminum-Alloy Forgings

By **Roy E. Paine**—Works Chief Metallurgist, Aluminum Co. of America, Los Angeles

Problems arise in production of aircraft forgings. Grainflow patterns must be known.

Ultrasonic testing—which involves more than product inspection—meets the need.

▪ Modern aircraft meet high-performance levels—far above those of a decade ago. As a direct result, the aircraft industry requires tight quality control of aluminum forgings. Here's why.

High - strength, aluminum - alloy forgings serve as major structural components in aircraft for several reasons. They have a high strength to weight ratio and good directional properties. Their toughness is that of a thoroughly worked structure with closely controlled grain flow.

Meet Aerospace Use — These forgings machine easily. And, they exhibit a high order of dimensional control and stability.

Their surface offers an attractive appearance. This appearance often eliminates the need for costly finishing. Where surface finishing is a must, aluminum forgings lend themselves to various finishing methods.

Aluminum forgings also go into missiles, where reliable performance must be of the highest order. Thus, the development of testing methods to check internal quality assumes great importance.

Recently, progress has been made in nondestructive testing. One important advance has been in ultrasonics. This inspection method provides a nondestructive means of gaging the internal quality of various parts.

Avoid Waste — Alcoa's concern with ultrasonic testing involves much more than final—or product—inspection. Actually, the value of nondestructive tests appears early in the manufacturing cycle. Their use avoids waste by weeding out questionable material.

These tests also measure the ca-

pabilities of a manufacturing process and determine the effects of process changes. This presents a forceful point in support of the argument that the producer, rather than a third party, must be responsible for product inspection—on his customer's order.

Every producer is responsible for improving his product. A better product should always be his goal. Therefore, data concerning product characteristics assists him in working toward this goal.

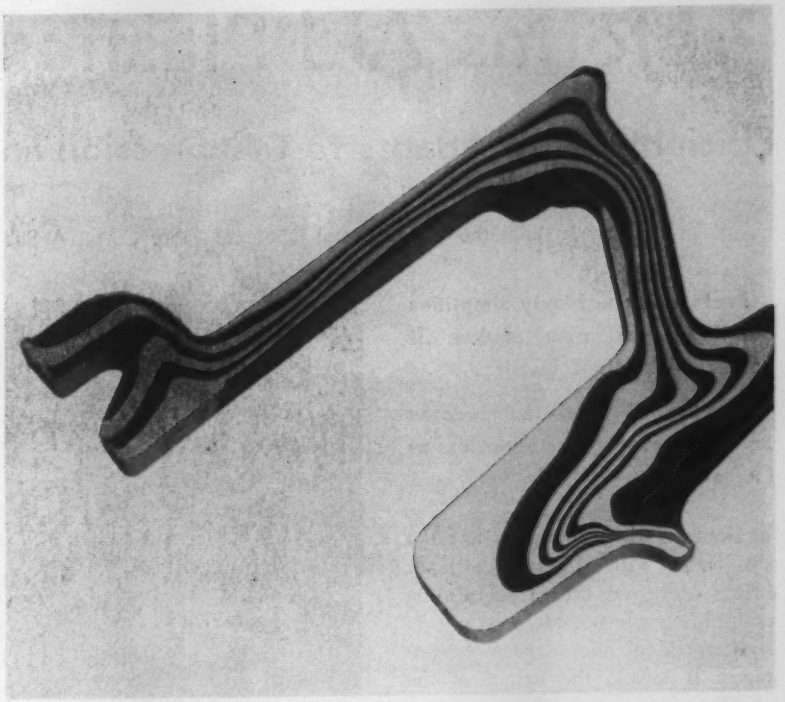
At Alcoa, jurisdiction over laboratories at the works level rests with the Alcoa Research Laboratories. This organization maintains strict surveillance procedure. This assures that testing equipment is properly cared for and calibrated. It also makes certain that only approved testing methods are used.

Challenges Arise—Product users require and have a right to expect that suppliers describe their products in terms of guarantees. Such guarantees can be established, however, only after a producer carefully analyzes the results of many checks on his products.

New challenges arise as forgings of different or more intricate shapes are produced. Complex shapes, and the presence of nonparallel and curved surfaces, require constant development of new ultrasonic methods to assure top quality. Producers, users and inspection-equipment makers all contribute to progress in this field.

The aluminum industry recognizes its obligations to its customers. It continues to improve the soundness of its products. But, no one should assume that such improvements automatically prevent fatigue sites from occurring in aircraft parts.

The aircraft industry recognizes that design and workmanship is just as important, or even more important, than internal-stress conditions. Re-entrant angles, tight fits, and raggedly sheared or drilled edges present examples of workmanship factors that are potential fatigue sources.



GRAIN PATTERN: Etched cross section of forging shows how grain-flow pattern conforms to part's shape, giving good directional properties.

SOUND PARTS: Ultrasonic inspection detects aircraft forging flaws. Water immersion provides key to rapid, nondestructive-testing method.

Preforms Aid Plastic Molding

Efficient Setup Adapts to Compression and Transfer Molding

By J. A. Petho—Continental-Diamond Fibre Corp., A Subsidiary of The Budd Co., Newark, Del.

Preforming not only simplifies molding, but also makes it easier to control quality.

On top of that, the process can achieve high production at low cost.

■ Demand for plastic parts of large size and with irregular shapes brings increased use of preforming of molding compounds.

Preforming offers three advantages: It lowers the height of the mold; reduces the labor required for charging the mold; and permits high-frequency heating of the material before placing in the mold.

In conventional loading of a mold, the loose charge has a bulk factor that varies from 5 to 1 up to 10 to 1. It takes a high ring mold with a high top plate to take care of the bulk factor.

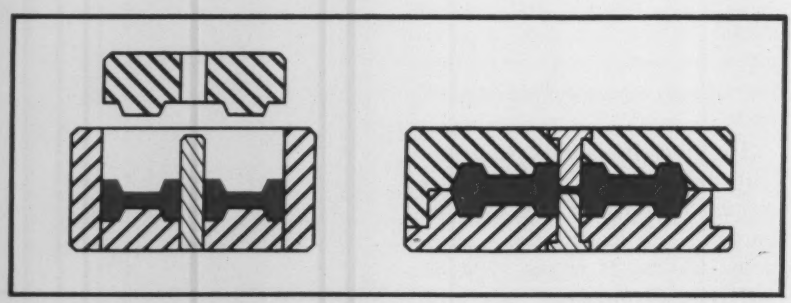
In this type of molding, heat losses are high and it's often necessary to heat the ring and top plate. Molds are expensive and removal of the part can be difficult.

Cuts Bulk Factor — How does preforming compare? For large molded parts, preforming of high-impact materials, such as macerated fabric, glass and asbestos, reduces the bulk factor to about 2 to 1.

In reducing mold height, the mold designer gets savings of 15 to 20 pct in mold cost. It opens the way to new mold designs, such as flash-type molds.

Of the various types of flash mold designs, such as center flash, top flash, etc., the center flash mold offers the simplest part removal and savings in labor costs of 5 to 15 pct. The center flash mold consists of one top and one bottom

STRESS UNIFORMITY: Operator carefully weighs macerated material that will be preformed and used for the web of an automotive timing gear. Proper weight and pressure is vital in producing uniform molded parts.



COMPARE MOLD DESIGN: Ring-type compression mold (left) needs a bulk factor of at least 5 to 1. Improved center-flashed compression mold (right) using preformed disks, offers simple loading and part removal.

plate with one half the cavity in each plate.

Advantage in Loading—Preforming can be in the form of pellets, disks or shapes. Depending on the material, it can also be automatic, semi-automatic, or manual. Whatever the method used, each type of preform will reduce overall labor cost in loading a mold.

There are two important factors to bear in mind in preforming different materials. First, preforms other than pellets must be uniform in weight and within close dimensional limits to fit the mold cavity.

Secondly, preforms must be uniform in density to permit high-frequency heating. This means that the preform mold must receive a uniform charge of material.

Ways to Avoid Lines—If more than one disk-type preform is used in one mold, you should roughen both the top and bottom surfaces of these preforms. Otherwise, a definite line will be produced at the preform contacts.

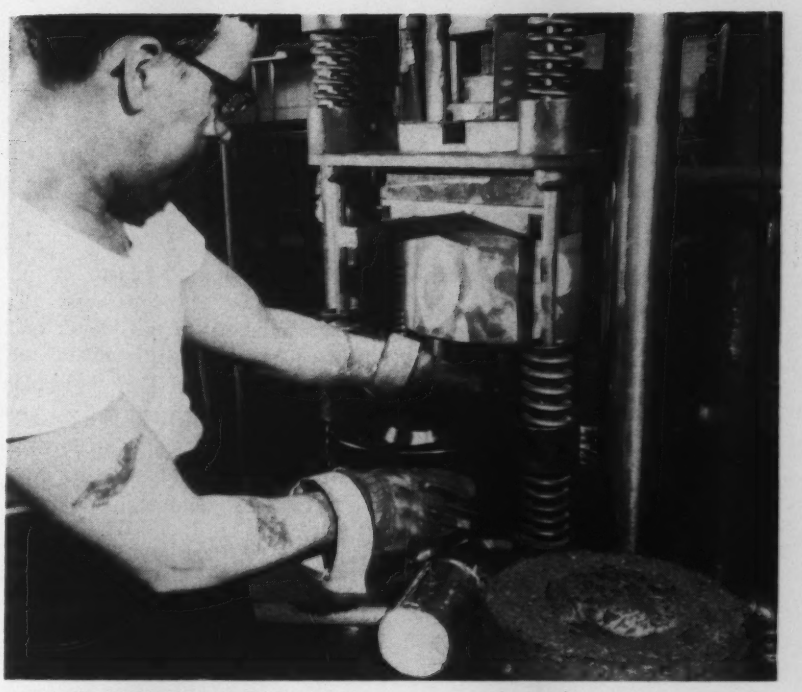
Another way to eliminate this line is to make the preforms smaller than the mold cavity. Then a crumbling of the preform takes place under molding pressure.

Preforms of uniform density can be high-frequency heated. It results in a faster cure time in the mold and reduction in the moisture content of the material.

Reduces Heating Time — For transfer molding, the material can be preformed in disk form. Disks are high-frequency heated before placing in the heating chamber for transfer to the mold cavity.

A further advantage of using preforms is that they can be made ahead of time and stored with less danger of moisture pick-up than with storing loose material.

When forcing inserts into a finished part, it's important to have both molding pressure and preform pressure in the same direction. Further, it's recommended that inserts run parallel with these pressures. By so doing, the holding strength of insert increases 30 pct.



STACK PREFORMS: Three preforms are compression molded into industrial truck wheel. Roughening preforms helps eliminate demarcation lines.

EASY LOADING: Preformed web, together with preformed laminated rim, is placed in compression mold. Molding takes place at 4500 psi, 330°F.

Flame Intensity Acts as Guide For Oxygen Steel Process

Wanted: a record of furnace-flame intensity to show progress of steelmaking reaction.

Here's the answer: a new, automatic system that measures heat radiation.

■ Charting the course of Jones & Laughlin's basic oxygen process is a newly devised flame measurement system. In operation at the Aliquippa, Pa. plant, the system keeps a continuous-chart record of flame intensity above the furnace.

By noting reaction progress, the record indicates to the melter and furnace operator the start of the silicon blow, carbon blow, and when the heat is ready to be tapped.

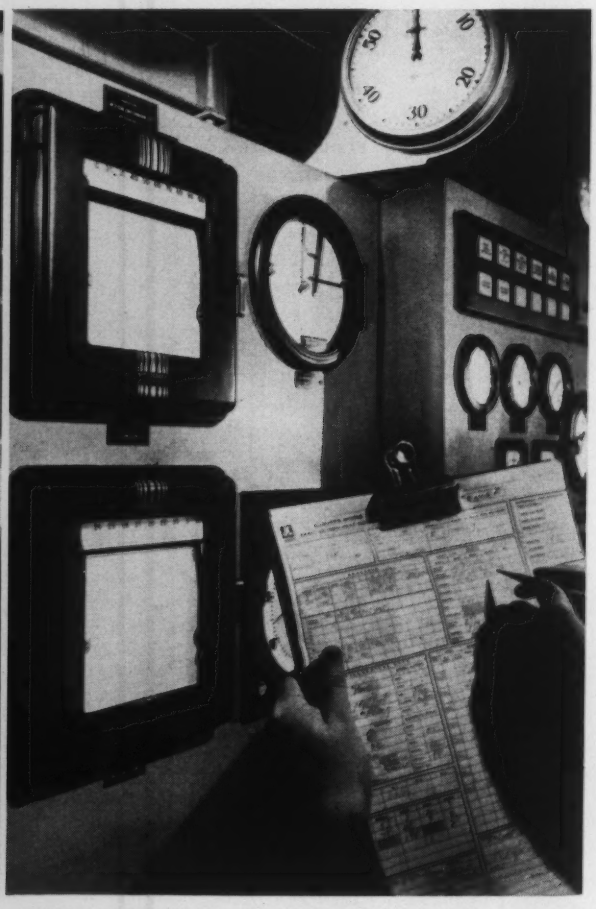
Result: an increase in furnace production by eliminating the need to correct for final temperature.

Lowers Oxygen Lance—As practiced at J & L, basic oxygen steel is made in two refractory lined furnaces which are used alternately. After charging, the furnace is rotated to an upright position, and an oxygen lance lowers to a set position above the bath.

Oxygen, at 180 psi, is then turned on; rapid oxidation of silicon, manganese and carbon takes place almost instantaneously.

At the end of the refining period, the flame at the furnace mouth visibly drops. At this time, the oxygen lance is raised and the furnace is tilted back to a horizontal position.

FOR FUTURE STUDY: Furnace operator writes heat number beside each record to identify readings.



LOGS VITAL DATA: Flame intensity is recorded on chart from which operator can log all data.

Bath temperature is then checked with an immersion thermocouple. If the reading is too low for pouring, the oxygen blow continues. If temperature is too high, it is reduced by adding scrap. If satisfactory, the furnace is tilted in the opposite direction and the steel tapped into a standard ladle.

Gives a Profile—When the process was first studied, it was noted that standard steelmaking instrumentation meets most of the needs of the new process. But there was one added aspect—that of recording flame intensity above the furnace.

J & L engineers felt that such a record would give a valuable profile of the reaction's progress. With the help of the Leeds & Northrup Co., Philadelphia, the new flame measuring system was devised.

Reacts to Heat—The flame sensing element is a Rayotube radiation detector mounted on top of the "pulpit" about 10 ft from the top edge of the furnace and hood.

This detector responds to the total amount of heat radiated by the flame, and focuses the heat energy through a precision optical system onto a small thermopile within the detector.

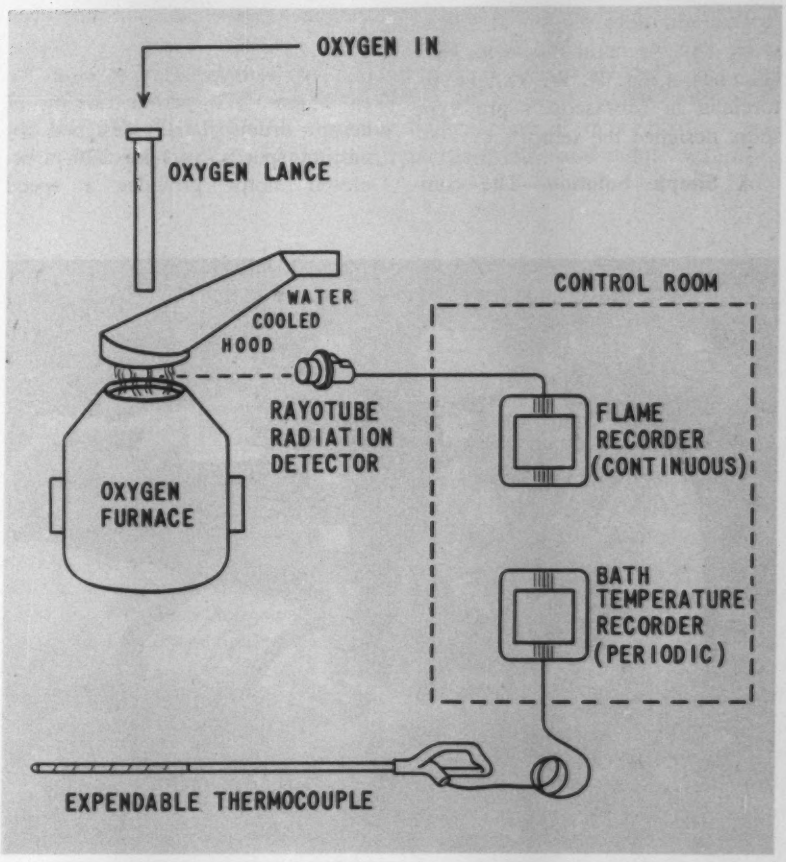
Flame radiation is thus transformed into a variable voltage that is plotted by a Speedomax Type G instrument into a curve. This plot is easily read by the melter and furnace operator.

Aids Accuracy—Measurements are exact. Two features of the system are partly responsible. There is a small aperture in a steel plate mounted in front of the detector's optical unit. It assists accuracy by limiting the area measured to that between the furnace top and the hood.

Temperature is checked, at present, with a Leeds & Northrup expendable, immersion thermocouple, and recorder. Since thermocouple tips are used only once, accuracy is excellent.

TILTS FOR CHARGING: Hot metal is charged into one of the two new basic oxygen converters at Jones & Laughlin's Aliquippa, Pa. plant.

How Measuring System Works



RECORDS FLAME INTENSITY: Rayotube radiation detector automatically measures total heat radiation of flame between furnace and hood.

Drum Machining Setup Copes With Precision Computer Part

Final performance of a computor depends on accuracy of many components.

While the memory drum is one of the most critical, this production setup insures quality.

■ A new precision turning device makes possible extremely accurate electronic computer memory drums, machined to tolerances of 0.000050 in. The specially built machine replaces a precision lathe-and-saddle fixture formerly used to turn the final diameter of memory drums.

The unit does its job at Librascope Div., General Precision, Inc., Glendale, Calif. R. W. Van Holm, foreman in Librascope's prototype shop, designed the setup.

A Simple Solution—The complete prototype, including power, was built at less than the cost of the original saddle fixture alone, yet it eliminates all deficiencies of the lathe-saddle combination. Complex construction of the latter fixture and the need for exacting tolerances previously hampered quantity production efforts. Changing from one type drum to another was also difficult.

The new machine can finish all sizes of drums currently produced at Librascope. Present drum dimensions range from 4¼ to 7½ in. in diameter and up to 14 in. in length. Additional capacity permits the machine's use for finishing even larger drums.

Tool feed speeds vary from ¼ to 5 ipm. To permit turning of certain drums at their designed operating speeds, a 1-hp 220-v enclosed motor provides a speed range of 600 to 5850 rpm and drives thin belts which rotate the drums.

Precise Control—A pneumatic cylinder drives the tool holder. Control of the oil flow from a hydrocheck cylinder, against which the pneumatic cylinder works, regulates the speed of tool holder traverse.

Specially ground diamond tools and the precise pneumatic-hydraulic tool feed allow Librascope to obtain a finishing tolerance of 8 microinches or better without further operation.

Van's drum machine, as it's called, is mounted on a 24-by-36-in. Delta drill press table. Fixtures on the Delta table are easily changed which facilitates shifting from one type drum to another.

Provide Accuracy—To provide accurate mounting surfaces for all the fixtures used in the drum-finishing operations, the table was scraped and precision hand-lapped before assembly. Air-conditioning of the shop area keeps the machine at a fixed temperature.

Initial production orders, involving use of the unit to finish drums for incremental-type digital computers were tested at the Naval Ordnance Test Station, China Lake, Calif. Bearing bore alignments of the assembly were found to be in tolerance and concentric to within 0.000050-in. T I R over an 11-in. span.

It's the vital functions performed by the drums that demand such close machining tolerances. To store information in a computer's memory, pulses are recorded on the drum's magnetic surface. It's like the encoding of sound onto tape for a common tape recorder. As

FINAL FITTING: Assembly is critical. End bells get final fitting to shroud assembly which encloses finished memory drum of computer.

many as 500,000 bits of information may be stored in large memory drums in 1 second.

Affects Whole System—The final performance of a computer depends on the accuracy of the pulses stored in the memory drum and the accuracy with which the computer can interpret the bits of information represented by the recorded pulses. Because the drum's accuracy helps determine over-all computer system accuracy, high quality drum production is one of the most exacting operations in the whole computer manufacturing industry.

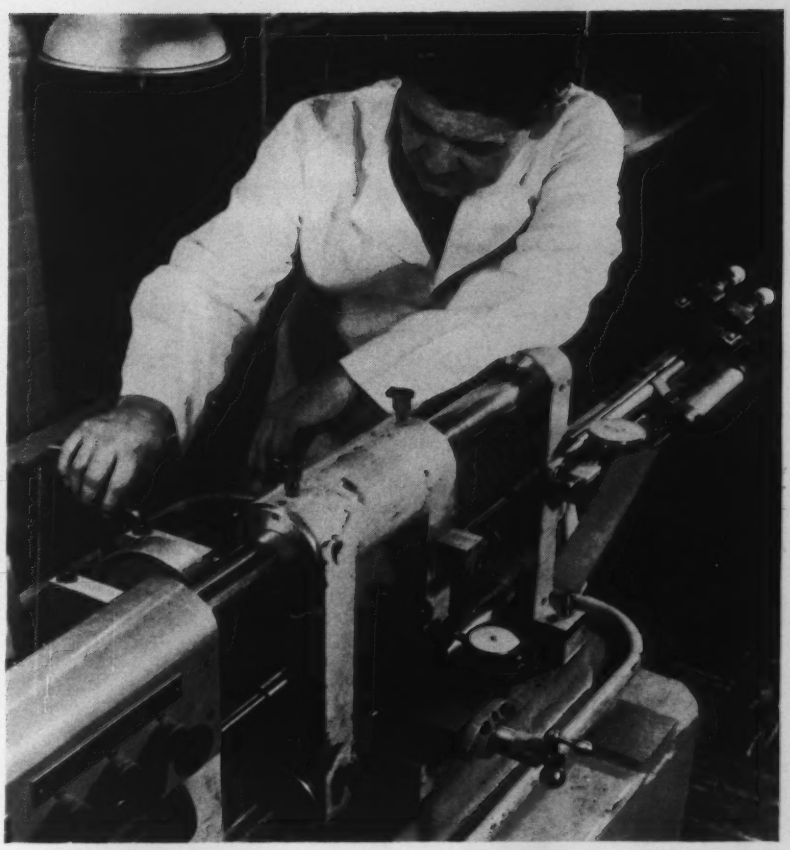
A finished memory drum assembly consists of four parts: the actual drum, a synchronous electric motor which rotates the drum at speeds up to 6000 rpm, an enclosing shroud in which the drum is mounted, and read/write heads. In a typical drum assembly an average of 40 read/write heads are mounted along the length and circumference of the enclosing shroud.

Critical design and construction parameters govern drum assembly production. Each head must be set exactly at the same head-to-drum distance. If one misaligned head touches and scores the spinning drum, permanent damage results.

Roundness a Must—If the head-to-drum separation is too great, deteriorated electronic signals result, lessening the computer's reliability. If the drum is out-of-round by any detectable value, signal modulation produces false computer answers. Thus, drum-diameter tolerance in an advanced computer must fall within +0.000050-in., —0.000000-in.

Because head-to-drum clearances must remain stable under all operating temperature conditions, all drum assembly materials are carefully selected to assure proper heat-expansion properties in relation to the drum alloy. The drum itself is made from a special aluminum alloy.

In the production sequence, a precision lathe performs the first major machining operation which includes turning the diameter, relieving the undercut, and forming the axle hub. After reversal of the drum in the lathe, a tracing attachment retraces the pattern to insure machining of the other side of the drum with exactly the same contour.



ACHIEVES PRECISION: Operator tightens one of many fixtures used with precision turning machine that replaces a lathe-and-saddle fixture.

Dry Ice for Fit—A hole is bored in the axle which is then heated to 300°F, while dry ice shrinks the steel shaft to fit its final position in the drum. Two matched sets of ball bearings—precision-ground to insure common concentricity with a T I R of less than 0.000050 in. on the journal—are then mounted onto the steel shaft.

Eccentric spots on the two sets of ball bearings are carefully aligned along the shaft to prevent possible interaction between high spots. Various types of drums are mounted in the shroud subassemblies which best fit the outside diameter of the bearings.

All subsequent drum machining is done on its own bearings to keep the radial run-out under 0.000060-in. T I R and the lateral run-out under 0.0005 in. After a surface cut on the diameter, the drum is dynamically balanced and sent to the prototype shop for final finishing by Van's drum machine.

After the finishing cut, drums are coated with a 0.001-in. layer of iron oxide to provide the magnetic writing surface. The drums are statically and dynamically balanced to within a double-amplitude unbalance of less than 600-micro-oz in. at 6000 rpm.

QUICK FUSION: Oxyacetylene flame fuses paste to a conveyor screw mounted in rotating fixture.

TOUGH ALLOY: Hard-surfaced flights last about 5 to 6 times longer than the unprotected units.

Paste Hard Coats Conveyor

Alloys With Base Metal to Form Abrasion-Resistant Surface

A paste overlay, applied to conveyor flights, penetrates the base metal about three times the applied thickness.

This process increases screw conveyor life about 500 pct.

■ By applying a fused-paste overlay to the flights of a screw-type conveyor, the Industrial Machinery Co., Forth Worth, Tex., increases the conveyor's life about 500 pct. This hard-surfacing method proves itself in both laboratory and field tests.

It also brings about a new line of helical-screw conveyors. Industrial calls these conveyors abrasion resistant.

Handle Abrasives — The hard-surfaced conveyors are well suited to conveying materials which are abrasive by nature — and which cause rapid flight wear. Typical materials for which the abrasion-resistant conveyor screws are recommended include: alumina, bauxite, cement, cinders, coke, ground brick and slag.

Food industry uses include: soy beans, pellet-type processed feeds and similar free-flowing abrasive materials.

In making the abrasion-resistant unit, the company starts with a standard screw — mounted in a rotating fixture. A worker applies Sweat-On paste, a product of the Wall Colmonoy Corp., Detroit, in a thin, even coating to the flights' wearing surfaces. The paste consists of a suspension of pure chromium-boride crystals in a suitable vehicle.

Alloy With Base Metal — After application, the paste dries in the air. When thoroughly dry, it's fused to the base metal by applying an oxyacetylene flame to the paste-coated surface. The screw rotates in the fixture while the flame is applied.

Unlike most hard-surfacing methods, paste application isn't a build-up process. Build-ups are limited to a few thousandths of an inch.

The pasted parts become hard-surfaced as the result of an alloying process. The base metal alloys with the paste to form an abrasion-resistant surface.

Penetration into the base metal is two to three times the applied paste thickness. Pound for pound, the paste covers about three times the area covered by rods or electrodes. This contributes to economic use.

Revere helps "fit the metal to the job"

AND A MAKER OF MEDICINE CABINET MIRROR FRAMES SAVES $10,000 A YEAR

As a result of a suggestion made by one of Revere's Technical Advisors, a maker of mirror frames for medicine cabinets has saved $10,000 a year on polishing costs alone. The suggestion was that, by changing to a brass of different grain size, the manufacturer might be able to save money on polishing costs and at the same time improve the quality of his product. (The 90° bend to which the mirror frames are subjected also had to be taken into consideration.)

Samples were made using a Revere Brass Strip with a smaller grain size as recommended by the Technical Advisor. Tests showed that, as a result of the change the manufacturer was able to realize a saving of 17¢ per mirror frame on polishing costs alone, with no increased costs in other operations, including the 90° bend. Based on the saving per frame this manufacturer has saved $10,000 per year for the past 4 years!

Here is still another example of how Revere's Technical Advisory Service working with the customer and the mill helped "fit the metal to the job," thus saving the customer money as well as improving product quality.

Why don't you take advantage of the extensive knowledge of Revere's Technical Advisory Service in "fitting the metal to the job?" It's entirely possible this service can save you money . . . help improve the quality of *your* product.

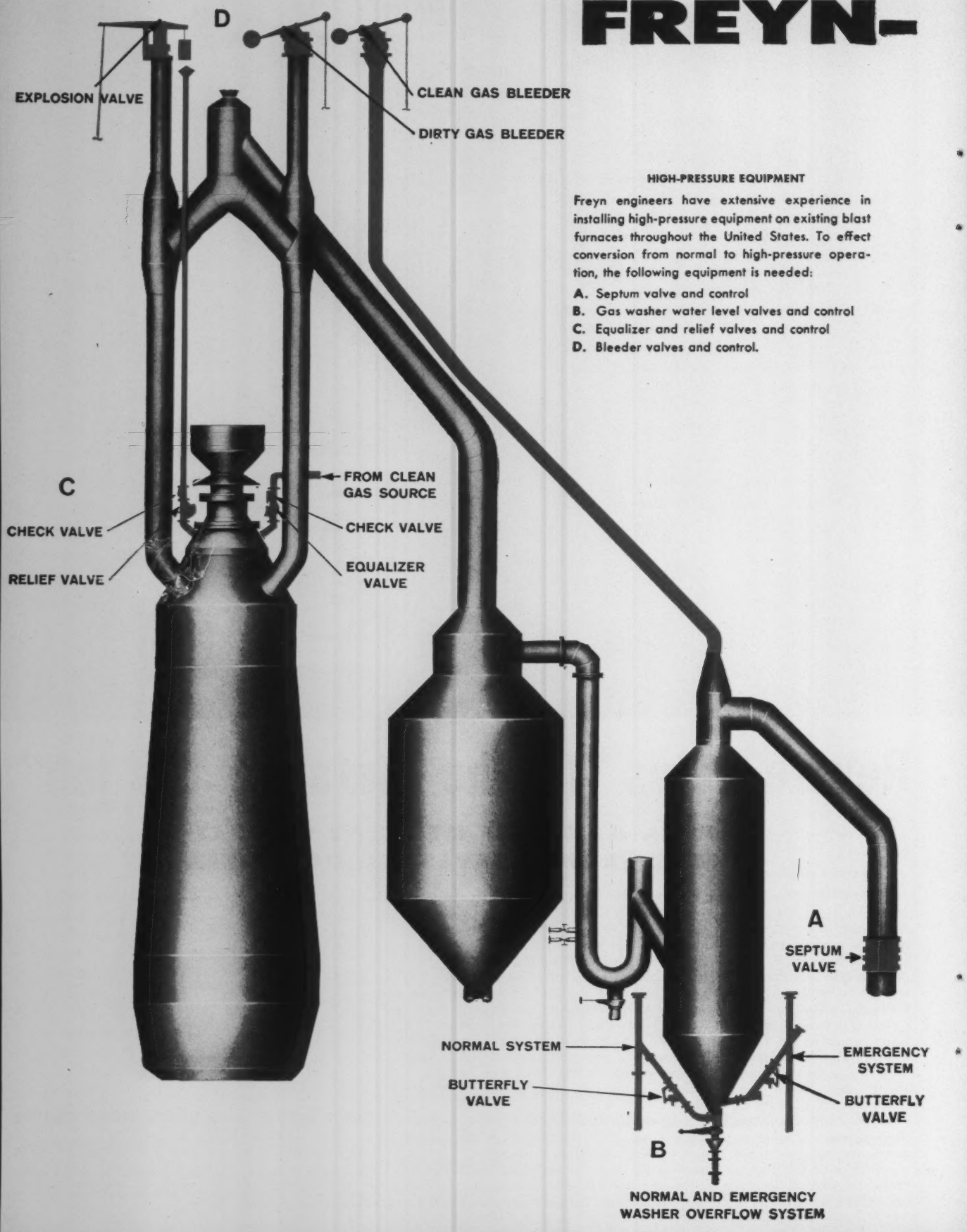
REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Fort Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

FREYN-



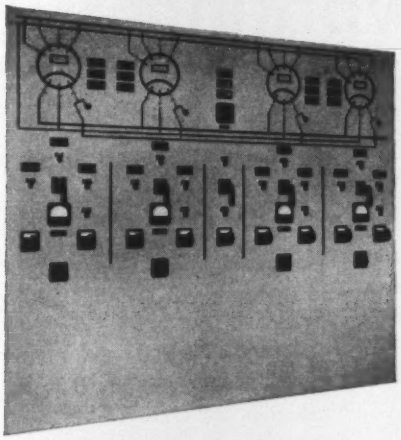
HIGH-PRESSURE EQUIPMENT

Freyn engineers have extensive experience in installing high-pressure equipment on existing blast furnaces throughout the United States. To effect conversion from normal to high-pressure operation, the following equipment is needed:

A. Septum valve and control
B. Gas washer water level valves and control
C. Equalizer and relief valves and control
D. Bleeder valves and control.

DESIGN EQUIPMENT

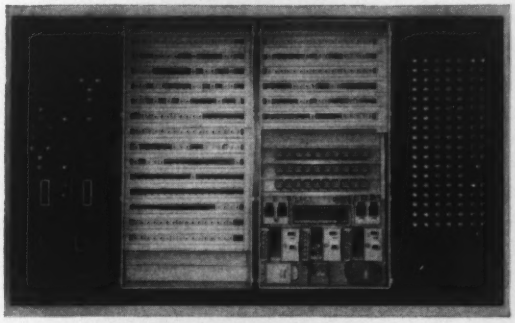
helps set new standards for blast furnace output



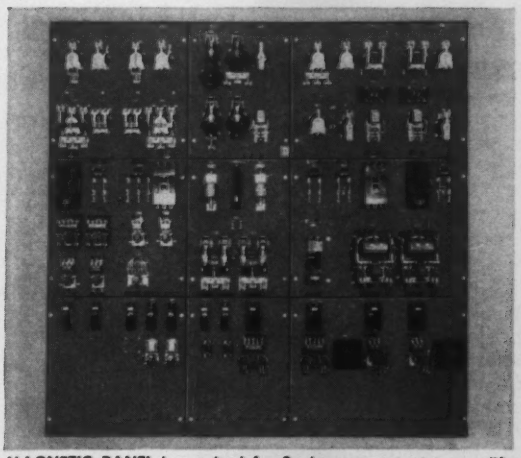
SYNOPTIC PANEL. Developed for use with completely automatic, electrically operated stove changing equipment, this master control panel is currently being installed in a large Northeastern plant. At a glance, the stove tender can quickly tell whether a stove is "on gas," "on blast," or "bottled up." Panel shows complete blast furnace piping arrangement, and is a graphic representation of the exact condition of the valves on each stove. Characteristic colors are used: Brown—stack gas; Blue—cold blast; Orange-Red—hot blast; and Yellow—gas. By pre-setting a selector switch, the stoves will be automatically changed in response to either time or temperature, without any attention from the stove tender. Provision is also made to take any one stove out of service and remain on a completely automatic sequence. Time loss in stove changing is greatly reduced.

In over 40 years as a leader in the design and construction of a complete line of blast furnace equipment, Freyn has pioneered many developments which have resulted in increased efficiency and greater output. You benefit from this unique combination of experience and service, because you know Freyn equipment can be depended upon to give you unequalled performance—with minimum maintenance and a high degree of operating economy.

In the areas of completely automatic stove changing and high-pressure furnace operations, the equipment shown here is typical of the advances in blast furnace technology constantly being sought by forward thinking Freyn engineers. For information on how Freyn equipment might improve *your* operations, write: **Freyn Department, Koppers Company, Inc., Pittsburgh 19, Pa.**



STATIC SWITCHING PANEL replaces relay sequencing control in many new and rebuilt installations. This type of control is completely static, without any interposing relays. Maintenance normally connected with relay contacts, coils and moving parts is eliminated in static switching.



MAGNETIC PANEL is required for final power output to amplify signals from static switching panel. These signals actuate the distributor motors, stockline recorder motors, and the breeze belt and vibrating screen motors. Magnetic amplifiers are utilized for control devices as solenoid valves.

Changing Control • Skip Hoist • Pneumatic Bell Hoist • Stockline Recorder • Automatic Stove Changing Equipment • Motor Drive Snort Valve Operator • Pneumatic Sludge Ejector • High Pressure Equipment • Stove Burners • Stove Valves.

KOPPERS

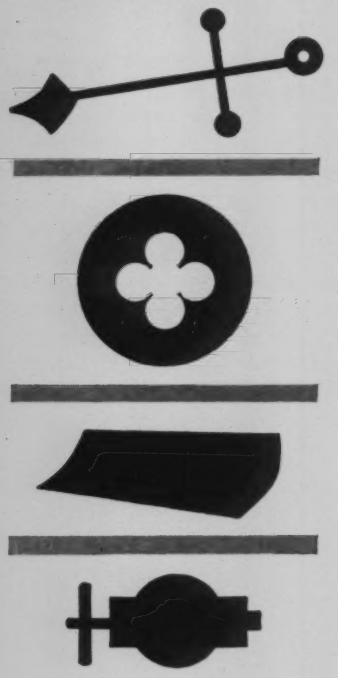
KOPPERS

FREYN DEPARTMENT

Maine Quiz #1

Can you identify these metal products produced in

MAINE?



Answers — 1. Boat Anchor
2. Cutting Die, 3. Bulldozer Blade
4. Industrial Valve

Currently 150 metal working plants manufacturing machinery and ordnance parts, fabricated metal products, transportation equipment, and primary metal products are located in Maine. Over 5000 skilled workers produce thousands of machine tooled products daily.

Maine will produce the item of your choice. *Maine is the state for your new plant.* Write for our 56-page directory of the metal working industry in Maine and the *plan for 100% financing of new construction.*

Lloyd K. Allen, Commissioner
Maine Department
of Economic Development
State Capitol Augusta, Maine

New Patents In Metalworking

Rolled-Steel Products

Method of producing rolled-steel products from fine-grained iron material, B. M. S. Kalling, S. G. H. Eketorp and F. C. E. Johansson (assigned to Stora Kopparsberg Bergslags Aktiebolaget, Domnarnet, Sweden), Feb. 16, 1960. In the manufacture of hot-rolled steel products directly from low-silicon pig-iron, the pig iron is mixed with an optimum amount of a pulverulent iron oxide material to reduce the carbon content of the pig, and the metal treated in a sheet-metal structure in the manner described. No. 2,925,337.

Continuous Heating

Metal-heating furnace system, F. S. Bloom and L. F. Conway (said Conway assigned to Bloom Engineering Co., Inc., Pittsburgh, Pa.), Mar. 8, 1960. Method for operating a continuous furnace for heating metal workpieces, such as billets, slabs, bars, and solid rounds, of relatively thicker section. This method, in the event of a delay or interruption, inhibits the burning or washing of the hotter metal, as well as the production of underheated metal, when the operation resumes. No. 2,927,783.

Maintains Temperature

Bustle pipe for blast furnaces, W. Odendahl (assigned to Strico Gesellschaft fur Metallurgie und Warmetechnik m.b.H., Gummersback, Rhineland, Germany), Mar. 1, 1960. Design for a substantially annular blast furnace bustle pipe; uniform temperatures of the blast air at each tuyere are maintained so as to prevent under-cooling of the coke in the furnaces. No. 2,926,903.

Bath Control

Control of pickling baths, E. B. Mancke and C. W. Shingledecker (assigned to Bethlehem Steel Co., a corp. of Pa.), Mar. 8, 1960. Method for continuously maintaining the composition of a pickling bath within a desired predetermined range. Automatic additions of concentrated acid and of dilute acid are made in response to continuous conductivity and specific gravity measurements. No. 2,927,871.

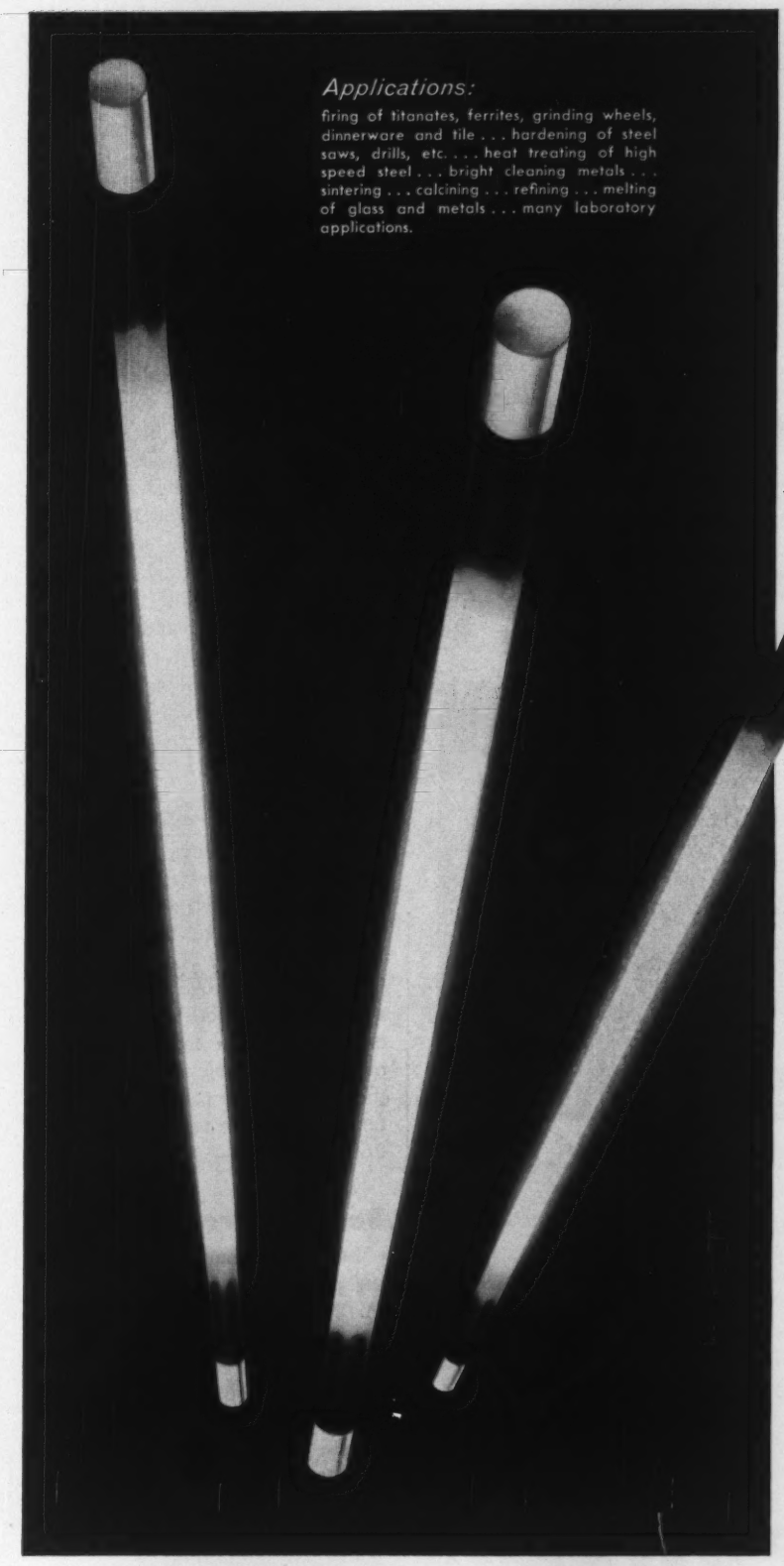
"Patent Review" appears in the third issue of The IRON AGE each month. Look for it in the May 19 issue.

Protective Coatings

Aluminum-coating processes and compositions, A. R. Stetson (assigned to Solar Aircraft Co., San Diego, Calif.), Mar. 1, 1960. Methods and compositions for applying protective-aluminum or aluminum-alloy coatings to articles of ferrous material, such as stainless steels and super alloys. No. 2,927,043.

Strip-Cleaning Roll

Roll for cleaning continuous strip material, R. Wier, Jr. (assigned to Firestone Tire & Rubber Co., Akron, O.), Mar. 22, 1960. Design for a scrubber roll having


Applications:
firing of titanates, ferrites, grinding wheels, dinnerware and tile . . . hardening of steel saws, drills, etc. . . . heat treating of high speed steel . . . bright cleaning metals . . . sintering . . . calcining . . . refining . . . melting of glass and metals . . . many laboratory applications.

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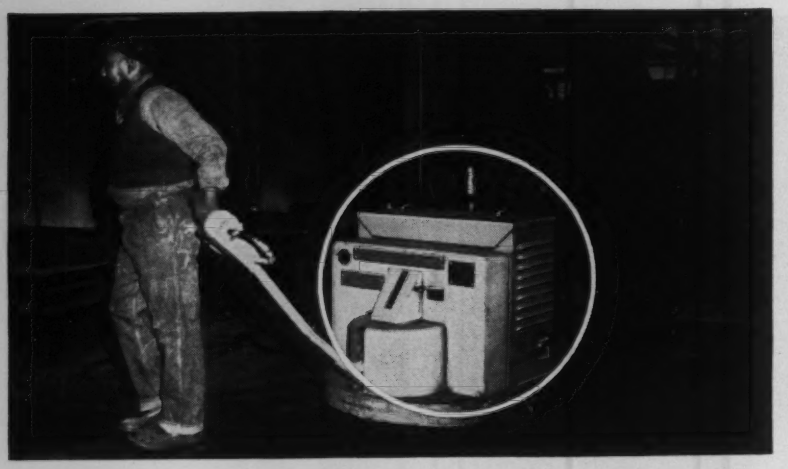
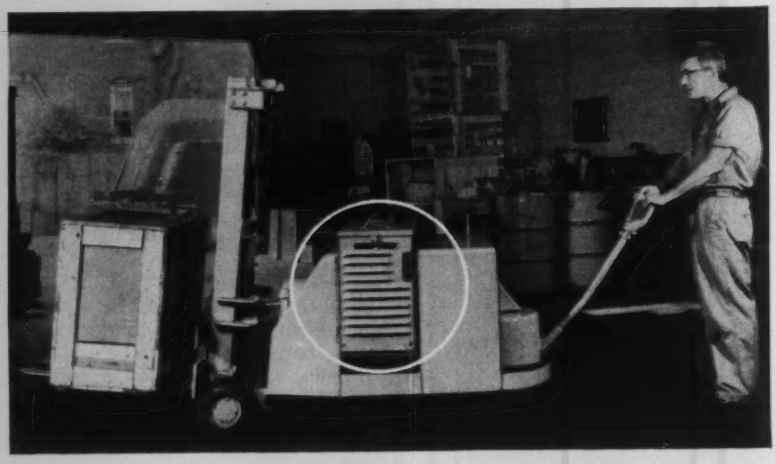


The Most Versatile Power Unit Ever Developed For Small Trucks

READY-POWER BANTAM MODEL W



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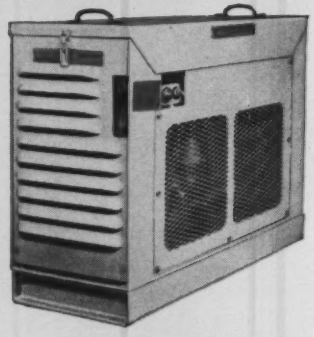
A new high-performance unit features 12-volt automotive-type starting and ignition system plus complete choice of idling speed. Full access to engine and generator simplifies adjustment, even on the truck. Fits practically all makes of walkie and rider trucks up to 2000 lbs. *Write today for full information.*



READY-POWER

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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

resilient flexible fingers; and adapted for the cleaning of steel strip for tinplating. This is done first by impact and then by a wiping and snapping action. The roll is built up of sections which may be readily replaced. No. 2,929,088.

Correct Temperatures

Temperature control during metal casting, L. E. Kraay (assigned to Inland Steel Co., Chicago, Ill.), Mar. 15, 1960. Method for avoiding excessive cooling of molten ferrous metal in a trough-type tundish or pouring box of a casting apparatus. Limited oxidation of the metal is effected with free oxygen so as to take advantage of the exothermic heat of oxidation to maintain the metal at the proper casting temperature. No. 2,928,-150.

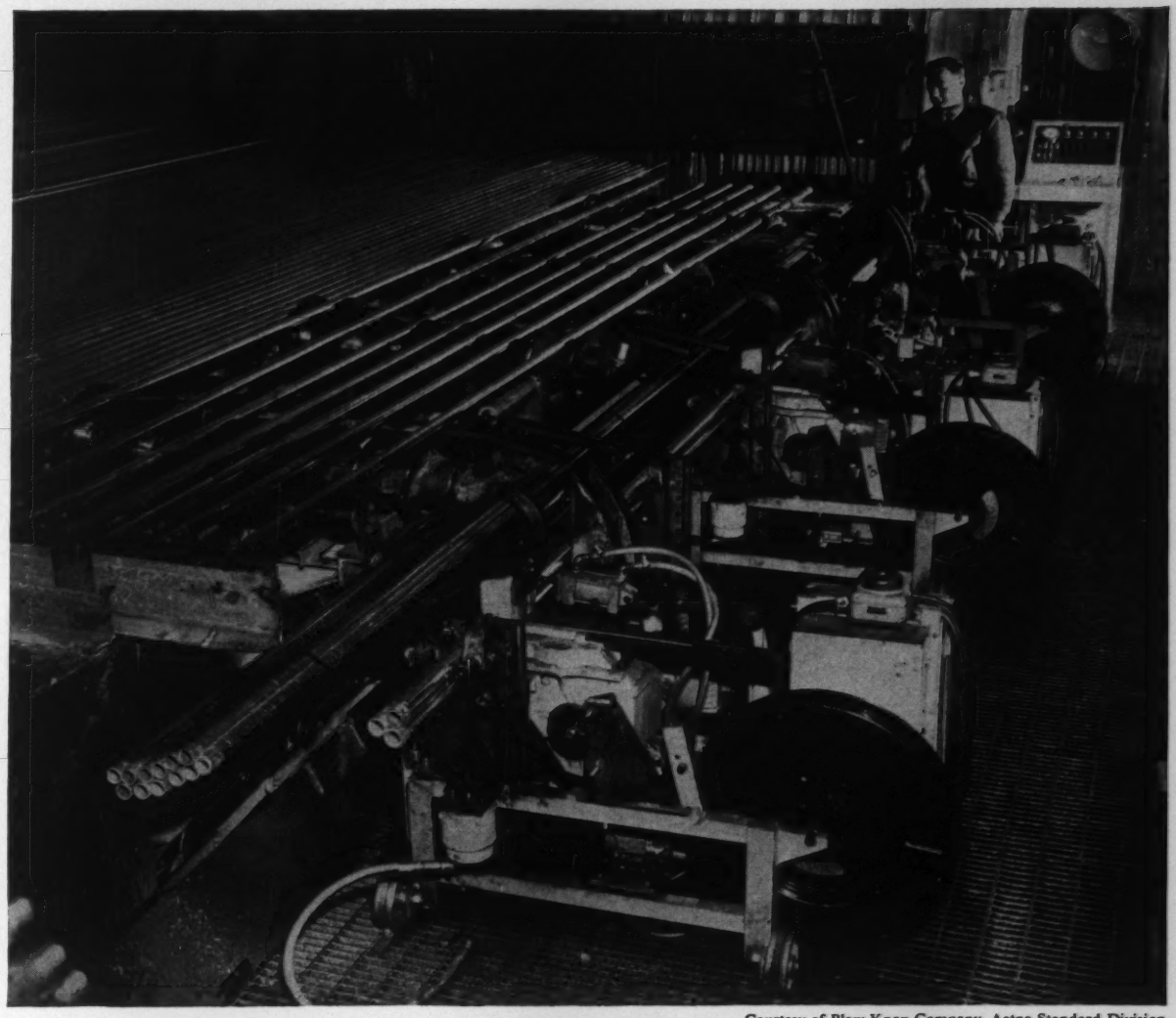
Blast-Stove Connection

Blast-furnace stove gas-port and burner nozzle construction, C. E. Genovese (assigned to U. S. Steel Corp., Pittsburgh, Pa.), Feb. 9, 1960. Improved connection for joining a blast-stove burner nozzle and stove gas-port in gas sealing engagement with each other which overcomes problems incident to thermal warpage caused by extreme temperature changes. No. 2,924,-269.

Bonding Properties

Method of improving the bonding properties of steel surfaces, P. H. Margulies (assigned to Food Machinery & Chemical Corp., San Jose, Calif.), Feb. 2, 1960. To improve the bonding properties of steel surfaces, the metal sheet or article is treated with an aqueous mixture of hydrogen peroxide, and either phosphoric acid or sulfuric acid or a mixture of those two acids. No. 2,923,608.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.



Courtesy of Blaw-Knox Company, Aetna-Standard Division

New Signode machines bundle pipe in seconds

Three synchronized Signode Model MS2BR power strapping machines are at work here. They automatically apply three straps per bundle. With these machines, it is now possible to keep ahead of the production of high speed pipe mills. Uniformly tight bundles are produced.

Similar Signode power strapping machines for pipe bundling have been proved dependable in more than six years of pipe mill service. They are ideal for strapping electrical metallic tubing and rigid conduit, as well as pipe. Write for more information about these machines or this installation. Signode counsel is available to help you work out a strapping installation that meets your requirements, no matter what your product. No obligation. Just write:

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SIGNODE STEEL STRAPPING CO.

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 171.

Control Systems

Covering every phase and component of soaking-pit control systems, a 12-page illustrated brochure also contains schematic drawings of several successful control-system installations. The transition from hydraulic to pneumatic to electronic controls is outlined, and four types of control systems with varying requirements are described in detail. Recuperator protection and temperature overshoot are discussed, and diagrams and charts, showing methods for overcoming these problems, are also included. (Hagan Chemicals & Controls, Inc.)

For free copy circle No. 1 on postcard, p. 171

Radiant Heat

A 20-page bulletin gives complete data on infrared heating. Principles, advantages and typical standard systems are discussed. Illustrations help to round out an informative source of heating studies. (Fostoria Corp.)

For free copy circle No. 2 on postcard, p. 171

Technical Data Books

A free catalog contains information on pocket-sized, technical-data books. Each book sells for $1.25. Among the fields covered are: automotive engineering, diesel engineering, machine design, data for machinists, steam engineering, hydraulics, steel forms and shapes, electrical transmissions, architecture, reinforced concrete and many others. (Lefax Publishers)

For free copy circle No. 3 on postcard, p. 171

Bearing Units

Pillow blocks, flange blocks and take-up-units are discussed in a 20-page catalog. Also included are detailed specifications, comparisons and load-rating charts. Most of the units are available in 29 shaft sizes from ½ to 2-7/16 in. (Browning Mfg. Co.)

For free copy circle No. 4 on postcard, p. 171

Machine Ductile Iron

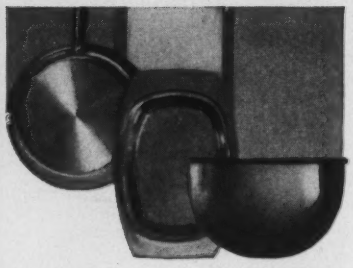
An 18-page booklet presents a thorough review of the various machining and grinding techniques recommended for all grades of ductile iron. Typical microstructures are illustrated. Descriptive sections cover recommended tool materials, tool geometry, cutting speeds, lubricants, grinding wheels and ground-surface finishes. (The International Nickel Co., Inc.)

For free copy circle No. 5 on postcard, p. 171

Steel-Bonded Carbides

Carbide tips or entire tools, to withstand high temperatures or corrosive media, can be made right in the shop. Conventional tools machine stainless steel-bonded carbides. Available in two grades, these materials are produced by powder metallurgy methods which imbed tiny crystals of titanium carbide in a softer matrix of stainless steel. (Sintercast Div., Chromalloy Corp.)

For free copy circle No. 6 on postcard, p. 171



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Your J&L stainless steel distributor can serve you better *because J&L serves him better,* backing him with the full facilities of J&L's Stainless and Strip Division.

Your J&L distributor can reduce your costs by providing a complete range of pre-production services, and doing it economically! He can save you the capital investment required to maintain long term inventories; he can help you eliminate the costs of overhead connected with stocking, accounting, and the inevitable losses incurred through waste and obsolescence due to specification changes.

Technical assistance in solving production problems is also available from your J&L distributor . . . when those problems are connected with an application using stainless steel, J&L's own staff of technical specialists will promptly answer your distributor's call for additional help.

Even when advanced research is required you can call on your J&L distributor in confidence. He will be happy to discuss your problem because he knows he is backed by one of the world's most respected teams of metallurgists—J&L's own staff in laboratories at Detroit and the famous Graham Research Laboratories at Pittsburgh.

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2 worn-out spindles received early Sunday... 2 rebuilt spindles in service Monday morning, 600 miles away!

The customer was in Greenville, South Carolina working on a time contract with stiff penalties for failing to meet the deadline. The spindles on two of their most important machine tools failed almost simultaneously and there were no spares available.

Our subsidiary, Dixie Bearings, Inc., was called late Saturday; our Spindle Repair Department in Cleveland alerted and, with the cooperation of Eastern Airlines, the spindles were in our shop early Sunday. By working all day Sunday, the spindles were back in Greenville and in operation on Monday morning!

This is only one of the many bearing services we provide. For fast help in solving any problem involving bearings—for quick delivery of any nationally known make of bearing—call the branch nearest you, day or night!

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and in the South ➤ **DIXIE BEARINGS, INC.**

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FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Boring Mills

A 42-page bulletin describes and illustrates a complete line of vertical boring mills, ranging in capacity from a swing of 7 ft to 42 ft and larger. Included in the profusely illustrated bulletin are complete specifications for each mill. Descriptions of optional features also appear in clear detail. (Consolidated Machine Tool Div., Farrel-Birmingham Co., Inc.)

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Soldering Booklet

A handy booklet, written especially for production personnel who are involved in soft and hard soldering, provides an interesting summary of the origin and uses of the soldering process throughout the world. It then describes in detail the various types of solders and fluxes. A special section is devoted to the soldering of aluminum. (Anchor Metal Co., Inc.)

For free copy circle No. 22 on postcard

Threading Tools

Tangential die-head chasers are discussed in detail in a 10-page bulletin. Among the items covered are: tangential design, cutting angles, throat angles, rake angles, special chaser designs and roughing and finishing chasers. Ordering information also appears in the bulletin. (Landis Machine Co.)

For free copy circle No. 23 on postcard

V-Belts

Specifications and list prices appear in a short data sheet on a new line of V-belts. Synthetic cord gives increased horsepower capacity and permits smaller and more compact drives. (Browning Mfg. Co.)

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Architectural Aluminum

Complete technical information and specifications on warehoused architectural aluminum appear in detail in an illustrated brochure. The brochure covers: structural shapes, extruded tubing, handrails, pipe rails, window sills, thresholds, bar and rod. It also contains data on alloys of plain, embossed and colored sheet. (Reynolds Metals Co.)

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Elastomers

Describing capabilities in design of custom-built elastomers, a six-page bulletin features illustrated examples of custom-built elastomers that helped turn designers' ideas into useful products. A two-page chart lists the general properties of the 10 major elastomers. The bulletin emphasizes that feasibility of a new product idea may depend on the availability of the right elastomer. (Lord Mfg. Co.)

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Engine Oil Tanks

Custom fabricated tanks for engine oil, used with aircraft and missiles, are discussed in an eight-page catalog. Engineering requirements are listed and illustrated, and a number of unusual configurations are shown. (United Aircraft Products, Inc.)

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Electric Carloaders

Three explosion-proof, battery-powered fork trucks, for use in hazardous locations, are illustrated and described in a four-page folder. The folder gives dimensional data and engineering specifications for the units—which can handle 3000-, 4000- and 5000-lb loads. Safety features incorporated in these trucks are discussed, and the folder tells why the trucks are fully approved

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FREE LITERATURE

by the Underwriters' Laboratories for use in locations where gasoline, naphtha, alcohols, acetone, benzine, butane, propane, benzol, lacquer and natural-gas vapors might be encountered. (Clark Equipment Co.)

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Shock Testing Machines

A complete line of shock testers, to accommodate a wide variety of testing requirements, appears in a four-page brochure. The shock testers are designed for laboratory and production testing in accordance with numerous specifications. Several pulse kits are available to enable selection of a unit suitable to a particular testing requirement. (Barry Controls Inc.)

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Hand Trucks

Illustrations and explanations point up features of a line of hand trucks which consist of single and double handle, open and platenose models. Also illustrated in the short bulletin are the rubber and metal wheels available for the various hand trucks. (The Rapids-Standard Co., Inc.)

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Speed-Control Systems

Amply illustrated with schematic and realistic drawings, an eight-page brochure explains a complete line of controlled-speed units. It shows how these units use alternating-current characteristics to provide adjustable speeds—by converting fixed-speed, alternating-current motors to adjustable speeds. (U. S. Electrical Motors Inc.)

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Welding Information

A 24-page brochure provides actual case histories of how modern resistance-welding machines are selected or specially engineered for the needs of particular welded products. Types of welding shown are: spot, seam, projection, arc, flash-butt and upset-butt. Also illustrated is metal gathering on many types of ferrous and nonferrous alloys. These alloys include: stainless steels, copper, aluminum, Inconel X, terne plate and others. (The Taylor Winfield Corp.)

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Machine Cleaner

An economical machine cleaner removes dirt, slime and oil. At the recommended dilution of 1:25 it will not rust the exposed parts of a machine. The mix can be used safely with no evidence of paint removal—thus it can also be used to clean the outside of a machine. An informative brochure points out how the cleaner should be used. (Cincinnati Milling Products Div., Cincinnati Milling and Grinding Machines, Inc.)

For free copy circle No. 33 on postcard

Cast-Alloy Data

The latest revision of the list of standard designations and chemical composition ranges for heat-and corrosion-resistant cast alloys is available. Noteworthy newcomers in the list of 32 grades are two corrosion-resistant alloys. These newcomers are designated CD-4MCu and CG-8M. (Alloy Casting Institute)

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Flexible Couplings

No lubrication and no maintenance are required by a complete line of flexible couplings. A short data sheet illustrates flexible couplings for use with high-speed, heavy-duty motors and turbine drives; light-load units for other uses; and miniature couplings for use in servo-mechanisms, computers and other small devices. (Thomas Flexible Coupling Co.)

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Spring Materials

Various spring properties of several groups of metal alloys are discussed in an eight-page handbook. Several comparison tables and charts are included. (Riverside-Alloy Metal Div., H. K. Porter Co., Inc.)

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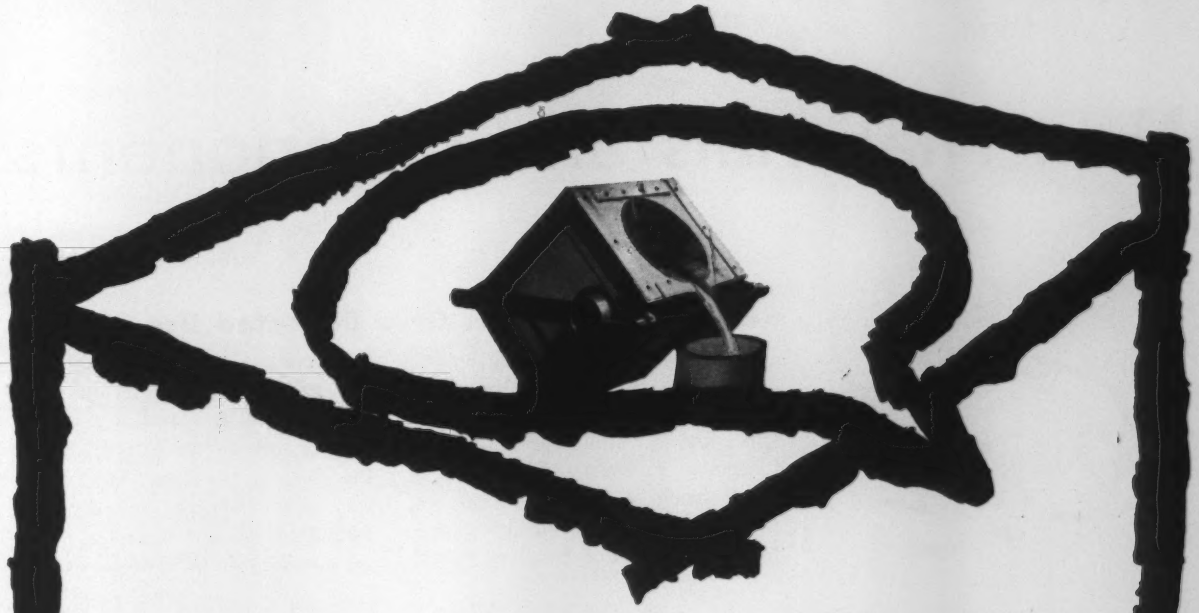
WHY BIG THINGS ARE HAPPENING IN INDUCTION MELTING



Everybody likes change! Particularly the kind of money-saving changes introduced by Inductotherm to induction melting in the past seven years.

To the basic advantages of induction melting, Inductotherm has added features that assure lower costs by simplifying installation, speeding operation, and reducing service requirements.

- Inducto® power feed through tilting furnace trunions cuts the cost of pit construction; saves power losses by reducing cable length.
- Rigid, heliarc welded furnace frame construction improves furnace life and lining life.
- Prepackaged, pretested Inducto control centers take the time, trouble, and expense out of control installation; make start-up swift, sure, and easy.
- The most space-saving induction melting systems ever available are the Inducto "Integral" series, which package motor-generators, capacitors, transformers and all controls *in one compact console!*

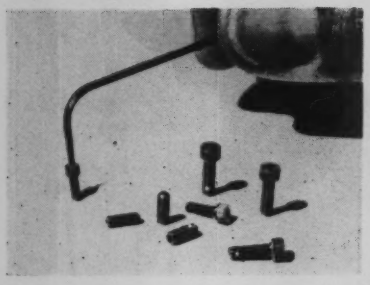
Big things are happening in induction melting because Inductotherm is making them happen. But the biggest innovation has been the Inductotherm concept of service. Not just fast repairs and overnight replacement of any parts . . . but the fact that *Inductotherm is in business to fit induction melting to your needs.* We will do everything in our power to improve our equipment and the induction technique, never asking you to trim your requirements to the limitations of our equipment.

If you'd like more information on Inductotherm furnaces, write for Bulletin 70. But, for a taste of Inductotherm service, ask to have an engineer call. Inductotherm Corporation, 412 Illinois Avenue, Delanco, New Jersey.

INDUCTOTHERM

See Us At The FOUNDRY SHOW—BOOTH 224

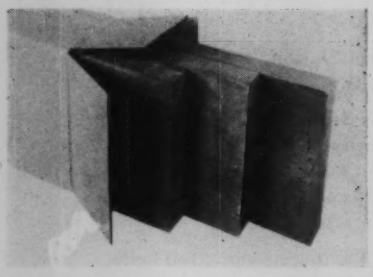
New Materials and Components



Self-Locking Screws Give Repeated Use

Used in tool, die, and machinery applications, a line of self-locking socket screws eliminates maintenance and downtime due to fastener loosening problems. Seated in a small recess near the end of the fastener, a compressible nylon pellet insures positive holding power, despite shock and severe vibration. The pellet compresses as the screw is inserted in a tapped hole or nut. Mating threads are forced together for positive locking. The screws stay locked, whether seated or not. (Standard Pressed Steel Co.)

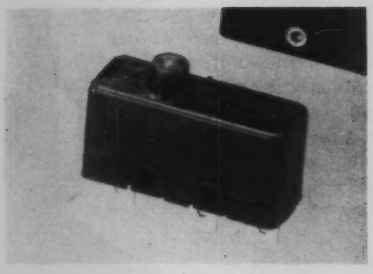
For more data circle No. 37 on postcard, p. 171



Plastic Planking Has Minimum Change

For pattern and master-model applications, a plastic planking material has a density comparable to that of mahogany. The material has built-in dimensional stability — shrinkage of only 0.001 in. per ft in any direction. The planks can be easily carved, sawed, chiseled, planed, or shaped with conventional wood-working tools. With proper techniques, the planks will take nails and screws. The planking material has no grain to contend with; properties run the same in all directions. (Ren Plastics, Inc.)

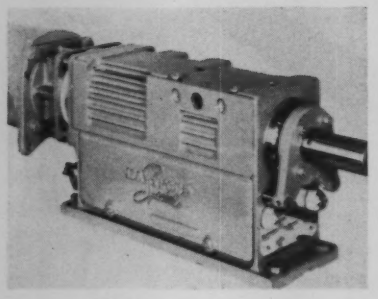
For more data circle No. 38 on postcard, p. 171



Small Switch Immune to Vibration and Shock

Less than half as large as a conventional switch, a miniature electrical switch has its mechanism molded into a phenolic case. A snap-on cover completely encloses it. Rated 10 amps for across-the-board use in industrial and commercial circuits, the single-pole, double-throw device features positive make-and-break action. The switch comes in three types: pin plunger, lever action, and bushing mount. Ruggedly constructed, the device also has high-contact pressure. (Controls Co. of America)

For more data circle No. 39 on postcard, p. 171



Drill Unit Suits Jobs Demanding Versatility

Designed for assembly into automatic production machines, an automatic drill unit features air-hydraulic operation. This hydraulic system provides smooth positive action. The unit gives fast positive adjustment for rapid advance, length of feed, rate of feed, and total length of stroke. Provision has also been made for back feed with independently adjustable rate, skip drilling, and dwell control. Various gear drives offer a wide range of spindle speeds. Overall length of the unit is 24 in., width is 5½ in., and height is 9⅛ in. (The Hartford Special Machinery Co.)

For more data circle No. 40 on postcard, p. 171

Find the "other man"!

Find the "other man" and you'll find another reason why you should come to Carlson for your stainless steel plate and other stainless products. The "other man" is an unseen crane operator. He, together with the hook-up man directing the loading of a stainless head in our shipping bay, is working "after hours" for one purpose—to assemble and ship a customer's order *fast*.

Why? The customer's production schedule may have changed suddenly. Perhaps quick delivery is needed to repair a vital piece of equipment. Whatever the reason, the customer knows he can count on Carlson for exceptional service. For Carlson is accustomed to producing and delivering, *fast*, a wide variety of high quality stainless steel products.

Specialized Carlson service is as near to you as your phone. Call or write for prompt action. The phone number: DUdley 4-2800.

G.O.CARLSON *Inc.*

Producers of Stainless Steel

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District Sales Offices in Principal Cities

PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS AND SHEETS (No. 1 Finish)

Another H&S Speed Reducer

on a tough job . . .

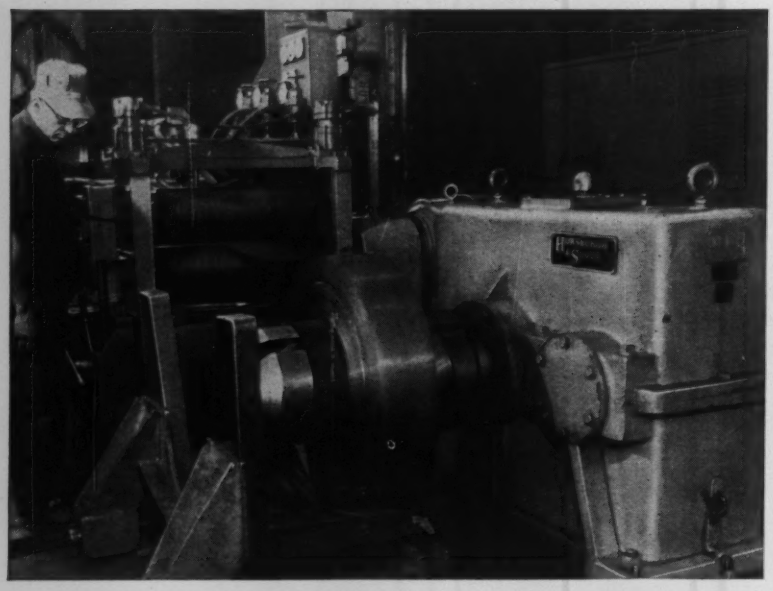
Built rugged for a critical rewind operation, this heavy overhung-load type H & S Herringbone Speed Reducer delivers day-in-day-out service under exacting load conditions.

This standard unit was selected for use on a Bliss precision rewind coiling machine—where strip steel must undergo tension controlled recoiling for subsequent annealing treatment.

Notice the sturdy shaft, with heavy-duty bearings designed to take this heavy overhung load. Observe the rugged housing, made to last.

This built-in toughness typifies H & S construction—on helical, herringbone, worm and combination units.

Send for detailed information on our facilities for producing a complete line of gears and speed reducers in a wide range of sizes and ratings.



Heavily loaded pay-off reel being driven by H & S Speed Reducer in plant of The Acme Steel Company, Chicago.

The HORSBURGH & SCOTT CO.

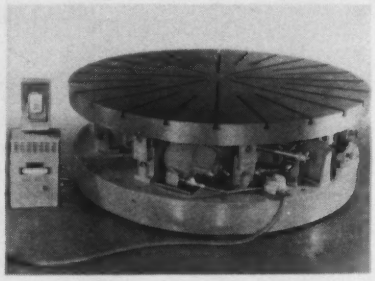
5112 Hamilton Avenue • Cleveland 14, Ohio

Specializing in fast production of quality Speed Reducers and Gearing to meet custom requirements.

DESIGN DIGEST

Rotary Table

Designed primarily for inspection and machining operations, a precision rotary table, 102 in. in diam, has a bearing-load capacity of 90,000 lb. The table features an accuracy of 5″ of an arc—certified by auto-collimator reading. Preliminary-rotation positioning is achieved



by a visible counter reading from 000 to 359°. Final position is manual and with the aid of a microscope. The platen and spindle assembly are supported by a precision "X"-type roller bearing plus auxiliary outer anti-friction bearing supports. (Machine Products Corp.)

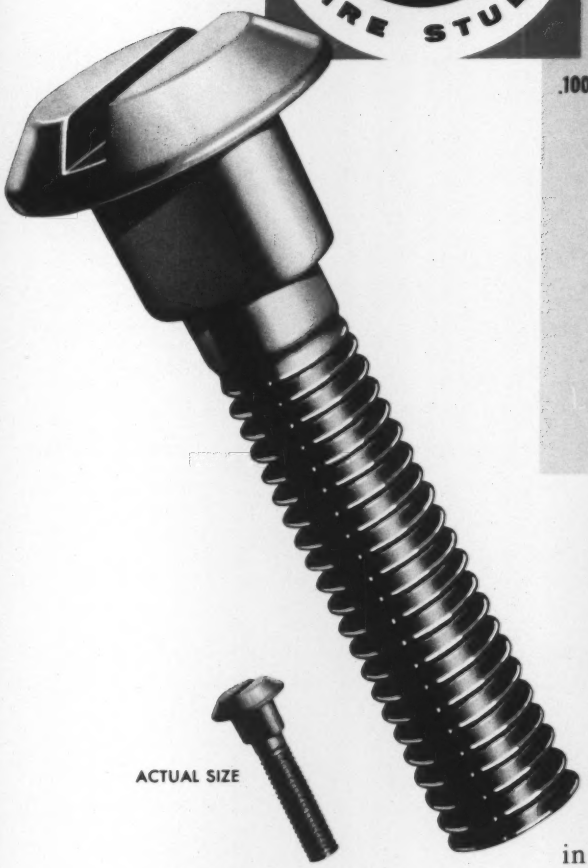
For more data circle No. 41 on postcard, p. 171

Air-Control Valves

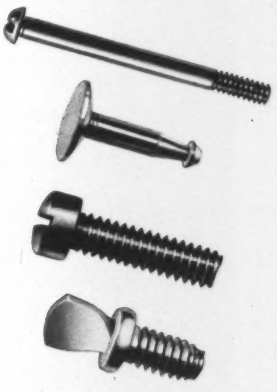
In less than 30 seconds a new air-control valve can be replaced. Only two cap screws need to be removed. Each valve has two replacement parts—the poppet spindle-

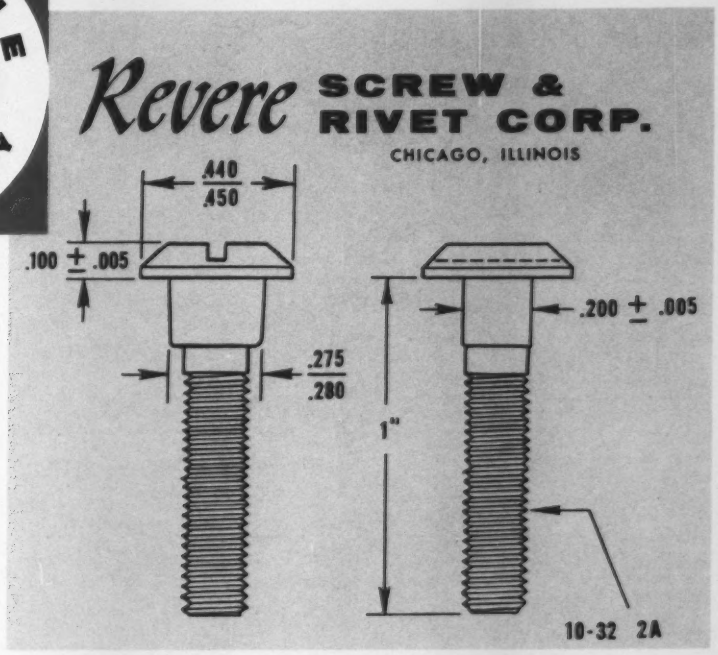
sleeve assembly and the solenoid pilot assembly. Each of these assemblies is a self-contained unit. Repacking requires no tools and

KEYSTONE XL WIRE STUDY



ACTUAL SIZE





heading problems solved *with Keystone XL Wire*

The cold heading of this generator shoulder bolt required extreme flow of material in concentric shapes, two diameters to be struck in one blow. Specifications were a rigid .005 tolerance. Because of the *flowability* characteristics of Keystone "XL" Wire, Revere Screw & Rivet Corp. have been able to produce this complicated fastener at high production rates and economical costs.

Revere president, Sol Gross, credits the uniform size and quality of Keystone "XL" Wire for increasing production, waste elimination and long die life. In fact, a three-fold increase in die life was realized.

Your cold heading problems can be simplified and solved when you put the *flowability* characteristic of Keystone "XL" Wire through your dies. Ask our Keystone wire specialists for complete information.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE WIRE FOR INDUSTRY

Add years to your hammer's life; improve performance with ERIE FOUNDRY REBUILDING SERVICE

Here at Erie Foundry we rejuvenate "old" forging hammers. First, we re-machine worn surfaces, true bearings, replace broken parts, repair cracked parts. Once the hammer is reassembled, tested and put back in operation, it's as spry and sound as a new machine—but at one-third the cost!

Stands to reason that the leaders in forge manufacture for over 60 years should be the best source for forge repair.

Regardless of who made it, or how badly it's cracked, broken or worn, your forging hammer will recover most quickly at Erie Foundry's Rebuilding "Hospital." Write for the complete story.

Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

ERIE

ONE OF THE GREAT NAMES IN FORGING SINCE 1895

ERIE FOUNDRY CO., Erie, Pa.

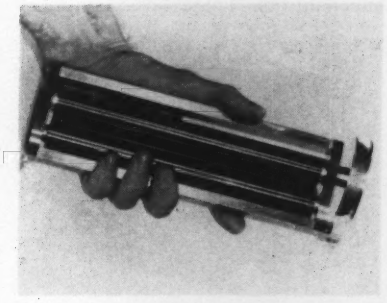
EF-60-02

takes less than one minute. Weighing only 4 lb, the valve handles a flow of 335 cfm with 100 psig initial pressure. A short-stroke pilot actuates the compact, full-orifice poppet spindle with almost no time lag. (Hunt Valve Co.)

For more data circle No. 42 on postcard, p. 171

Spring Motor

Fitting many applications, a tubular-shaped motor utilizes an extremely wide band of spring material. This material gives the motor its long, tubular shape. Some of

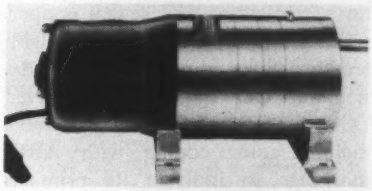


the many new applications opened up to the motor are: internal mounting in drums, long slender members, tubes, and masts. (Hunter Spring Co.)

For more data circle No. 43 on postcard, p. 171

Speed Governor

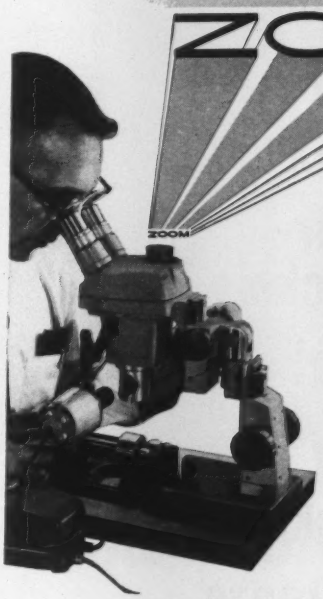
Based on differential measurement between known input speed and the speed to be detected, a centrifugal governor is capable of detecting speeds accurately, as low as ½ of 1 rpm. It's recommended for automatic shifting of machine-tool transmissions, protection of



low-speed mixers, dryers and similar processing equipment. It also handles sequencing of conveyors and automated systems, as well as special low-speed military applications. In addition, the governor provides a method of automatically controlling drum speeds in com-

ZOOM

Selling FASTER than any microscope in history!



NEW STEREOZOOM* MICROSCOPES BY BAUSCH & LOMB!

Breaking all sales records! Just try one in a free shop demonstration and you'll soon see why . . . they're the newest step forward to faster and easier 3D work.

EXCLUSIVE NEW OPTICS!

Get StereoZoom...continuously variable power! Just a turn of the knob gives an infinite choice of magnifications throughout the whole stereo range . . . to 120× on some models.

EXCLUSIVE NEW POWER POD DESIGN!

A wholly enclosed optical system in a single unit. Keeps out dust and dirt; eliminates old fashioned nosepieces, annoying image jump and blackout. NEW VERSATILITY, TOO! Your choice of StereoZoom or fixed power in a Power Pod that interchanges among any of five basic stands.

NEW LOW PRICE! About ⅓ lower than previous line.

*Trademark, Bausch & Lomb Optical Co.

BAUSCH & LOMB SINCE 1853

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86004 Bausch St., Rochester 2, N. Y.

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☐ Schedule a demonstration at my convenience.

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Phosphor Bronze
Nickel Silver
Cupro Nickel
Carbon Steel

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puters. Its service life is 1,500,000 cycles. (Torq Engineered Products, Inc.)

For more data circle No. 44 on postcard, p. 171

Amplifier Modules

A complete new line of high-reliability, solid-state signal amplifier modules meets use in many different fields. These include: electronic-power supply regulation; rotary-machine voltage; speed and frequency regulation; industrial-process control; and military servomechanisms. Three basic amplifier

circuits are employed—pure-transistor, pure-magnetic amplifier and a hybrid. All are transistor driven. The units feature fast response and high gain. The pure-magnetic-amplifier has high stability, reliability and overload capacity. Its response time and gain are more than adequate for most applications. (Regulators, Inc.)

For more data circle No. 45 on postcard, p. 171

Copper Tubing

Designed especially for refrigeration and air conditioning applications, a cleaned and sealed copper tube is available in 20-ft straight lengths. Sizes range from ¼ in. nominal OD to 4 in. inclusive. Other features of this seamless tube include color coding with ARC markings to indicate its primary use — for air-conditioning and refrigeration. (Wolverine Tube, Div. of Calumet & Helca, Inc.)

For more data circle No. 46 on postcard, p. 171

Brazing Alloy

Requiring no flux on copper to copper joints, a copper-phosphor-

ous alloy starts to melt at 1300°F, and has a wide brazing range. This general-purpose alloy finds use on copper, brass, bronze, and many other alloys. An extremely ductile rod, the brazing alloy is adaptable for electrical, construction, air-conditioning, heating, plumbing, and manufacturing industries. It has a high corrosion resistance and its tensile strength is 90,000 psi. (American Brazing Alloys Corp.)

For more data circle No. 47 on postcard, p. 171

Epoxy Coating

A clear, epoxy-polyester coating protects both treated and non-treated decorative aluminum products and surfaces, as well as brass and other metals. The original luster of the base metal is retained through the use of the coating which has a high degree of mar resistance. It also resists burns, cracking and staining. The flexible epoxy withstands a ⅛-in. bend. Coatings can be applied either by spray or dip. It's baked for 3-15 minutes at temperatures of 350°F. (John L. Armitage & Co.)

For more data circle No. 48 on postcard, p. 171

Degasser

Eliminating gas porosity in copper and copper-alloy castings, a degassing compound is in the form of cylindrical briquettes. Each of the briquettes have a hole through the center. Any suitably-designed metal, refractory, or graphite rod is inserted through the hole and the briquette plunged beneath the surface of the molten metal, where it decomposes rapidly to release the gases. Degassing with the compound can be carried out directly in lift-out, tilting or high-frequency furnaces. (Foundry Services, Inc.)

For more data circle No. 49 on postcard, p. 171

Vibration Detector

Using pneumatic lines for control power, a malfunction monitor detects excessive vibration in rotating and reciprocating machinery. Its use is intended for applications where electric control power is un-

Make room for PROFITS

Effective production and storage space is increased . . . lifting, conveying and stacking are done more quickly and cheaply, with fewer men . . . and re-handling is eliminated—when your plant is equipped with a rugged, dependable, **"Job-Mated"** crane by Shepard Niles.

Shepard Niles Cranes are supplied with the exact combination of capacity, clearance, speed and controls you need to assure more efficient and profitable plant operation. Whichever one best meets your precise job conditions, it will be built to the same high quality standards that have made Shepard Niles America's largest, most relied upon, manufacturer of hoists and cranes.

Why not get the full story on the complete line of **"Job-Mated"** cranes by Shepard Niles. Ask to have a Shepard Niles representative call at your convenience, and send for our descriptive bulletin.

Makers of cranes from 500 lbs. to 500 tons

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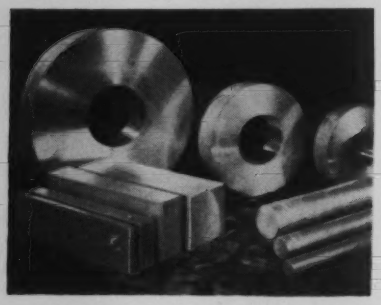
available or undesirable; where pneumatic pressure is plentiful; and in instances where pressure-loss sensing devices are already in use on pneumatic lines. The product is available in explosion- and weather-proof cases. (Robertshaw - Fulton Controls Co.)

For more data circle No. 50 on postcard, p. 171

Hard Bronze Alloy

A hard bronze die-alloy suits low - cost drawing, forming and



bending operations. It's adaptable to all press applications except blanking. And, it is reported to offer many advantages over other die alloys. These include: greater toughness; improved impact resistance; greater resistance to wear and abrasion; and improved machinability. (Ampco Metal, Inc.)

For more data circle No. 51 on postcard, p. 171

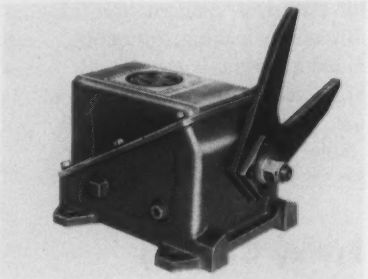
Porous Filter Element

A porous - metal - filter element utilizes a pressure-lock process to eliminate all defects and contaminants from welded or cemented construction. The high - pressure process locks together all components of the filter element so securely that the filter medium is embedded in the parent metal of the end caps to form a leak-proof seal. This is accomplished with a dovetailed construction. (Purolator Products, Inc.)

For more data circle No. 52 on postcard, p. 171

Limit Switch

For ore-bridge trolleys, slope hoists and similar high-speed applications, a heavy-duty limit switch provides several times the life of normal limit switches. It's suitable for use where travel speed is as high as 1200 fpm. This switch features a forked operating lever made of a special high-impact resisting



plastic. Unlike steel, this material doesn't damage the operating bar. Its resilience also reduces shock to the interior parts of the switch. The switch meets indoor and outdoor use. (EC&M Div., Square D Co.)

For more data circle No. 53 on postcard, p. 171

Retaining Ring

Made from flat spring steel, a self-locking retaining ring is coiled on edge to make a 360° retaining

EXECUTIVE REPORT #14

THEY STRETCH THE LIFE OF DRILLS

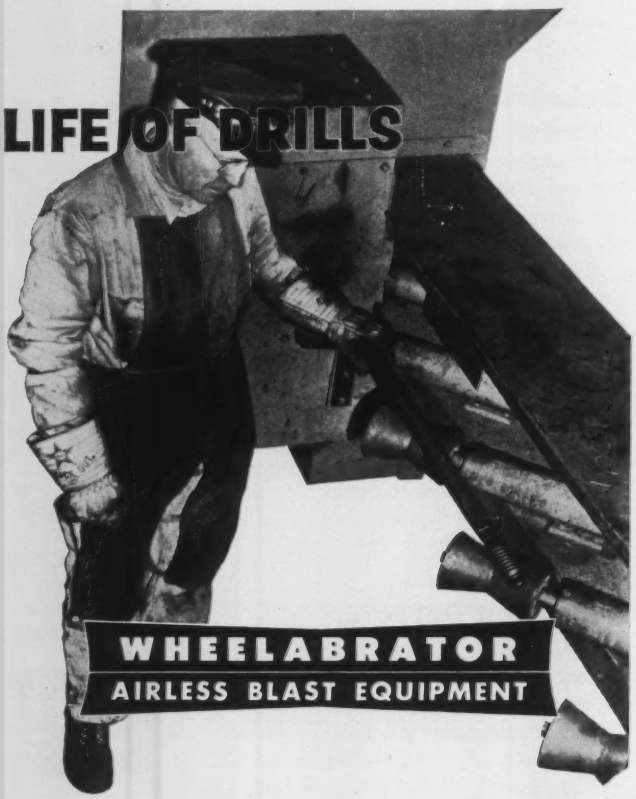
...with Wheelabrator® Shot Peening

Mining drills manufactured by the Gardner-Denver Co. last longer, dig deeper, with greatly increased resistance to fatigue failure imparted by Wheelabrator shot peening.

Passing through the Wheelabrator shot peening cabinet, the hollow steel drills take on favorable stresses that increase their service life many times. A plus benefit obtained is that heat treat scale is completely removed at the same time.

Life increases up to 1000% frequently achieved through Wheelabrator Shot Peening

Fatigue strength of gears, springs, and a wide range of other highly stressed steel parts can be increased substantially in Wheelabrator shot peening equipment. For engineering consultation write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.



surface. The ring is a two-turn, spiral-wound retaining ring incorporating two slots and two punched tangs to effect the self-locking action. The ring locks when centrifugal force is applied, or when dirt or other foreign material tends to force the retaining ring out of its groove. The rings have no lugs or protruding parts. (Ramsey Corp.)

For more data circle No. 54 on postcard, p. 171

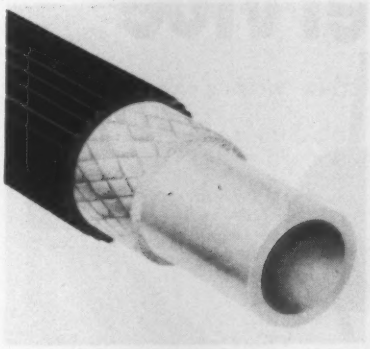
Anodizing Process

Completely new, an anodizing process creates a wide range of lasting colors for architectural aluminum applications. This process produces a superior anodic coating with a broad variety of colors, and an exceptionally high degree of color stability and uniformity. Available colors include: gold, amber, tan, brown, olive, gray and black. These distinctive colors do not come from use of organic dyes. Instead, lasting tones are created during the process through conversion of alloying elements within the metal itself. (Kaiser Aluminum & Chemical Sales, Inc.)

For more data circle No. 55 on postcard, p. 171

Pressure Hose

Versatile pressure hose meets many hydraulic and pneumatic applications. It replaces hose built to SAE Specification 100R1 single-wire braid. Applications for this



pressure hose abound in the fields of hydraulics, for both conventional and nonflammable fluids, pressure paint spraying, grease whips, catalyst and plastisol handling. The new hose is comprised of a precision-drawn inner core-tube of a special inert-polyamide formulation over which is braided a tough synthetic covering to provide high-burst resistance. A black plastic is extruded over the inner components to form a durable, abrasion-resistant outer sheath. (Synflex Products Div., Samuel Moore & Co.)

For more data circle No. 56 on postcard, p. 171

Metal Paste

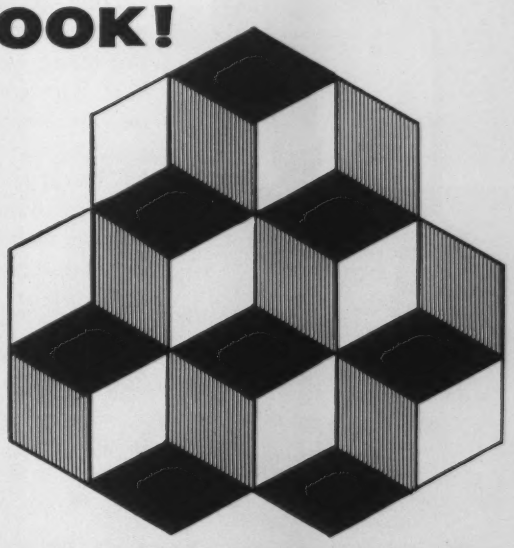
In paste form, a tough, versatile metal adheres permanently to metal, wood, plaster, glass or plastic. Applied right from the can, no two-part mixing or measuring, and no heat or special tools are required. The metal repair material withstands heat to 350°F, and when hard, it can be milled, drilled, tapped or ground. The material can be thinned to paste consistency, and brushed or sprayed as a waterproof, rustproof protective metal coat. It is also valuable as a production filler on metal or wood castings, patterns, and in metal-fabricating

EXECUTIVE REPORT #17

TAKE A SECOND LOOK!

Are you getting FULL Value for your Abrasive Dollar?

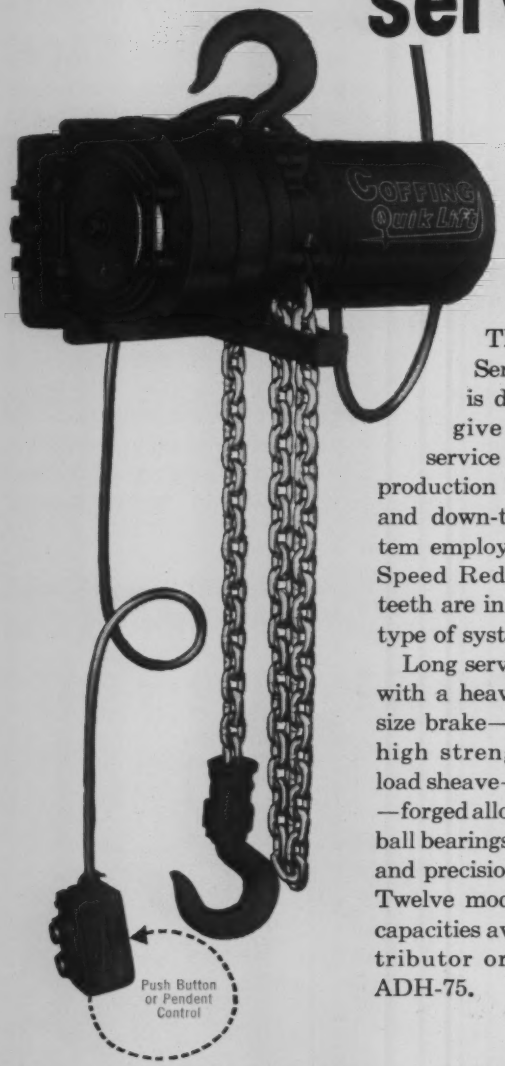
Count the cubes in the figure. You'll see six or seven, depending upon your point of view. Consider the total value of your present abrasive, and compare it with the proven value of Wheelabrator Steel Shot. Not just in price, but in abrasive consumption, cleaning speed, cleaning quality, and equipment maintenance costs as well. From any point of view, the proven quality of Wheelabrator Steel Shot adds up to extra value and extra profit.



Write today for this new handbook of blast cleaning abrasive performance. It's full of charts and facts you can use to help cut abrasive consumption, reduce cleaning costs. Write to Wheelabrator Corp., 510 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.

WHEELABRATOR
STEEL ABRASIVES

RUGGED for long and constant service



The Coffing Quik-Lift Series S Electric Hoist is designed and made to give dependable cycling service day after day on your production lines. To reduce wear and down-time the gearing system employs the patented Perry Speed Reducer in which more teeth are in mesh than any other type of system.

Long service life also is built in with a heavy-duty motor—oversize brake—safety limit switch—high strength, wear-resistant load sheave—alloy steel link chain—forged alloy hooks—heavy-duty ball bearings—lifetime lubrication and precision machined housings. Twelve models with ½ to 3-ton capacities available. Ask your distributor or write for Bulletin ADH-75.

COFFING HOISTS

DUFF-NORTON COMPANY

814 Walter Street • Danville, Illinois

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

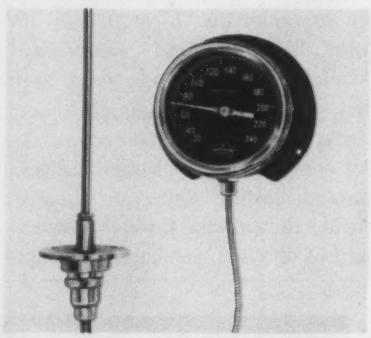
DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

industries where permanent adhesion is required and easy application desirable. (Alvin Products, Inc.)

For more data circle No. 57 on postcard, p. 171

Duct Thermometers

Mercury-actuated dial thermometers, for duct applications, feature ease of reading and dependable accuracy throughout their operating range. These gages are enclosed in black-enameled aluminum cases with chrome-plated slip rings. They are also available in a fully-compensated line up to 200 ft in length. Standard ranges are: —40/110°F, —20/110°F, 0/100°F, 30/150°F, 30/240°F, 100/400°F and 100/800°F. Other special ranges are available to meet all requirements. Standard sizes are 4½-, 6- and 8-in. dials. (Weksler Instruments Corp.)



For more data circle No. 58 on postcard, p. 171

Portable Cord

A new portable cord gives users at least three times more service than other cords. Its called TenX, and it features a conductor of special copper alloy. Individual strands of the conductor average 20 pct finer than those of similar cords, and they are rope stranded. Other construction features include a lead-cured neoprene jacket. This jacket is reinforced with a basket-weave braid for added strength. (Chemical and Metallurgical Div., General Electric Co.)

For more data circle No. 59 on postcard, p. 171

NEW BOOKS

"Mechanical Properties of Intermetallic Compounds," edited by J. H. Westbrook, provides the first and only explicit treatment of the detailed mechanical properties of various intermetallic compounds. It contains the proceedings of a special symposium held in Philadelphia in May 1959, sponsored by the Electrothermics and Metallurgy Div. of The Electrochemical Society, Inc. Broad coverage of the subject includes: phenomenology of the mechanical behavior of intermetallics; theoretical and experimental investigations of particular properties; experimental techniques for the preparation and study of intermetallics; and an extensive review of all literature on the subject. 435 pp. $9.50. John Wiley & Sons, Inc., 440 Park Ave., New York 16.

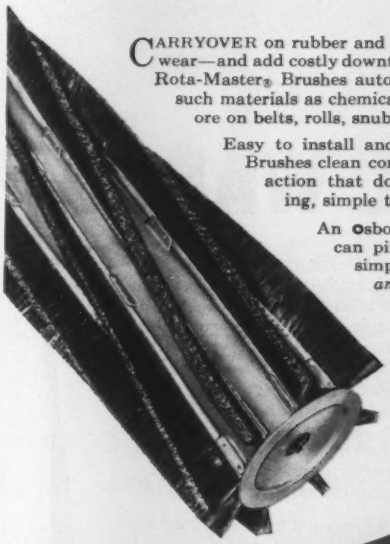
"Malleable Iron Castings" presents a comprehensive treatment of the subject of malleable iron with a judicious balance between all aspects of special interest to a wide variety of potential readers. This book should find favor with the student concerned with developing a first knowledge of the material; the foundryman who may require an authoritative answer for a specific question; and the design engineer who is primarily concerned with properties. It is quite evident that no pains have been spared in developing concrete factual information—while retaining a major degree of readability as an interesting narrative. 526 pp. $10.00. Malleable Founders Society, 781 Union Commerce Bldg., Cleveland 14.

"How to Build Profits by Controlling Costs" is written from the point-of-view of the small businessman and deals with one of the most difficult problems facing businessmen today—cost control. The initial part of the booklet uses the case history approach to common business problems experienced by a typical small business owner. It includes many suggestions for controlling costs. The second part of

OSBORN®

TO BEAT THE CARRYOVER PROBLEM ON CONVEYOR BELTS

here's how self-cleaning ROTA-MASTER® brushes cut downtime and maintenance costs

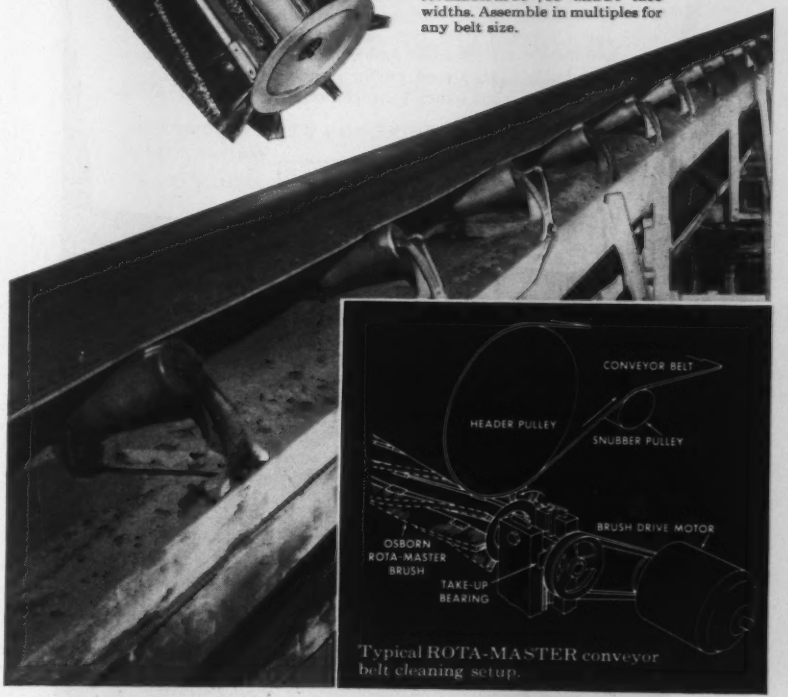


CARRYOVER on rubber and fabric conveyor belts can cause destructive wear—and add costly downtime hours spent in frequent cleaning. Osborn Rota-Master® Brushes automatically and efficiently prevent buildup of such materials as chemicals, food, tobacco chips, core sand, coke and ore on belts, rolls, snubber pulleys and return idlers.

Easy to install and adaptable to any system — Rota-Master Brushes clean conveyor belts with a unique, flexible sweeping action that does a thorough job. Brushes are self-cleaning, simple to adjust for correct brushing pressures.

An Osborn Brushing Analysis — at no obligation — can pinpoint exactly how you can cut costs and simplify your conveyor cleaning. *Write for details and a copy of the Rota-Master Brush booklet. The Osborn Manufacturing Company, Dept. F-95, Cleveland 14, Ohio.*

OSBORN ROTA-MASTER® BRUSH. Available in 16", 18" and 24" face widths. Assemble in multiples for any belt size.



Typical ROTA-MASTER conveyor belt cleaning setup.

METAL FINISHING MACHINES
... AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES
FOUNDRY PRODUCTION MACHINERY

Osborn Brushes

Hotpoint relies on . . .
FEDERAL-WARCO
Federal Multi-gun, combination spot and projection welders are a vital link in the exacting production schedules of Hotpoint ranges. The Federal unit shown below welds and forms range frames—adjusts to accommodate five cabinet sizes—maintains high Hotpoint volume without sacrificing quality standards.
Leading metal fabricators throughout the country have learned they can rely on Federal resistance welders and Warco mechanical presses for dependable high speed performance. Precision engineered to your exact requirement by
THE FEDERAL MACHINE AND WELDER COMPANY
Warren, Ohio
Federal WELDERS
Warco PRESSES
Federal Multi-gun, Combination Spot and Projection Welder #58W3096A-B.

NEW BOOKS

the booklet presents a step-by-step examination of record keeping, analysis of figures and the use of ratios as a means of comparing performances. This section enables the reader to work out a way to examine and control the costs of his business. 48 pp. $1.00. Dun & Bradstreet's Publications Div., P.O. Box 803, Church Street Station, New York 8.

"Classics in Management," edited by H. W. Merrill, presents a comprehensive collection of management thoughts. Until now, many of the classics of management—covered by this book—have been hidden in private collections or scattered in reference libraries. As a result, these timeless ideas have been until now largely unavailable to managers and other students of management. 446 pp. $9.00. American Management Association, 1515 Broadway, New York 36.

"Europe's Coal and Steel Community: An Experiment in Economic Union," by Louis Lister, presents a study in detail of the operations during the formative years of the first major experiment in European economic federation. The book analyzes the implications of a wider European economic and political integration. 495 pp. $8.00. The Twentieth Century Fund, 41 East 70th St., New York 21.

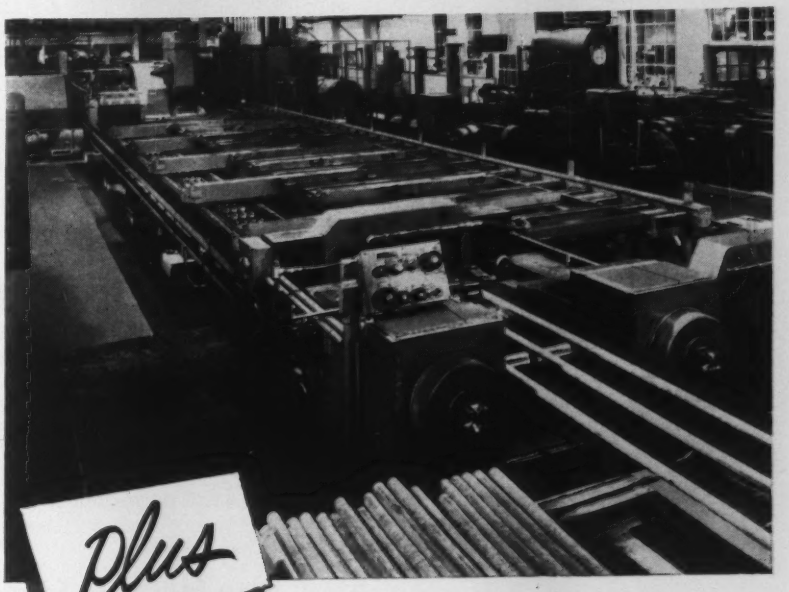
"Surface Effects on Spacecraft Materials," edited by F. J. Clauss, contains the transactions of the first symposium on the subject, held at Palo Alto, Calif., during May 1959. The book contains papers by 35 specialists on the requirements of materials for temperature-control surfaces of spacecraft and behavior of material surfaces in space. It begins with a study of the temperature - control problem. Among the subjects reviewed are methods of calculating the required radiation characteristics of surfaces, experience with temperature-control

systems on satellites and lunar probes launched to date, and methods for measuring the radiation characteristics of surfaces. 404 pp. $11.50. John Wiley & Sons, Inc., 440 Park Ave., New York 16.

"Engineering Manufacturing Methods," second edition, by G. S. Schaller, covers every phase of engineering manufacture. It gives a sound and complete treatment of fundamentals, emphasizing modern methods, equipment and theories. An introductory chapter deals with the broader aspects of management administration as applied to engineering materials. Special attention is given to aluminum, magnesium, cermets and plastics. Thoroughly revised, this second edition contains a wealth of material on recent developments in the field. 682 pp. $9.50. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36.

"The Corrosion and Oxidation of Metals" by U. R. Evans. The subject of corrosion possesses potential interest to diverse classes of people, including pure scientists, applied scientists and engineers. It also has an important economic aspect and a relationship with public health. Although this book has been written with all these classes in mind, it doesn't speak to them individually. In the first 18 chapters, equations have been removed from most of the text and confined to footnotes. This should help those who are not mathematicians. For the engineer who knows little chemistry there's an appendix which presents — in concise form—those principles of chemistry needed for the understanding of corrosion. A second appendix is devoted to physical chemistry, especially electrochemistry, for those pure scientists with little knowledge of kinetic aspects. The scope of the book is large. Each chapter is self-contained, with a synopsis at the beginning which summarizes its contents. 1105 pp. 202 figures. 47 tables. $25.00. St. Martin's Press, Inc., 175 Fifth Ave., New York 10.

MODERN FACILITIES-



Plus

CONSTANT QUALITY AND METALLURGICAL CONTROL in every step of processing

. . . assure positive uniformity from bar to bar—order to order

Four modern, well-equipped mills at Ambridge, Pa.; Chicago, Ill.; Newark, N.J.; and Putnam, Conn., insure prompt deliveries and service for all of your cold drawn steel requirements.

For the finest in Cold Finished Steels always . . . specify WYCKOFF!

SPECIALISTS IN COLD FINISHED STEELS EXCLUSIVELY

WYCKOFF STEEL COMPANY

GENERAL OFFICES:
Gateway Center, Pittsburgh 30, Pa.

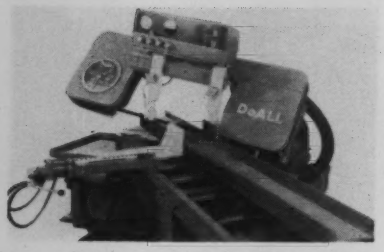
Branch Offices in Principal Cities

Works: Ambridge, Pa., Chicago, Ill., Newark, N.J., Putnam, Conn.

Steel

WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels including Carbon Corrected Steels

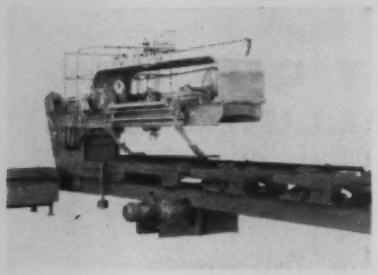
New Equipment and Machinery



Power Saws Cut at Any Angle With Accuracy

Designed for rigidity, an angle-cutting power saw brings high speed and accuracy to mitering and cut-off work. The work may range from stacks of small tool blanks to 12-in. I-beams. The turntable permits the entire cutting portion of the machine to be rotated from 90 to 45°. Rotation is hydraulically actuated, and the protractor scale is calibrated in ½° increments. Mitered parts infrequently need milling operations. (The DoAll Co.)

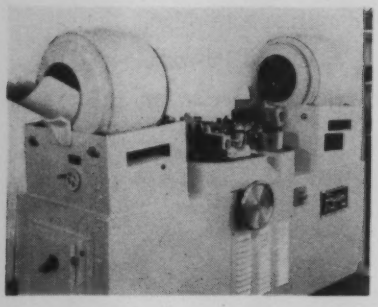
For more data circle No. 60 on postcard, p. 171



Stenciling Machine Stencils Information on Pipe

Completely automatic, a stenciling machine stencils such information as size, length, ASTM or API specifications and other pertinent data on pipe. The pipe may be double random, 21-ft uniform, single random, black, galvanized, reamed and drifted, plain end, threaded and coupled pipe. Bars may be marked in the same manner. Pipe handling is automatic from entry skids to discharge point by means of walking beams. Stenciling operation is accomplished by traveling spray guns. (Northeast Ohio Machine Builders, Inc.)

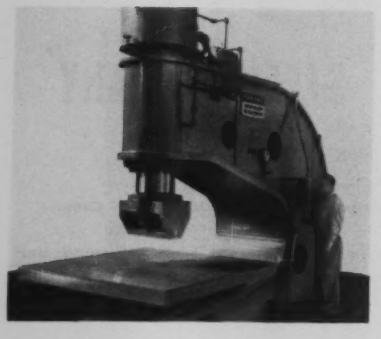
For more data circle No. 61 on postcard, p. 171



Thread Machine Threads Two Sizes at Once

Designed to run two different blank stock lengths at the same time, a thread-rolling machine can also operate one side at a time. The parts are kept separate with a different part leaving each side of the thread roller. The machine rolls screws, bolts and nails. It handles over-all blank stock lengths up to 3 in., and diameters up to 5/16 in. Some of its features include: rear loading during production; two cradled hoppers with external drive; rapid adjusting feed-rail width. The machine can also perform roll forming, knurling, marking, serrating, and necking. (Prutton Corp.)

For more data circle No. 62 on postcard, p. 171

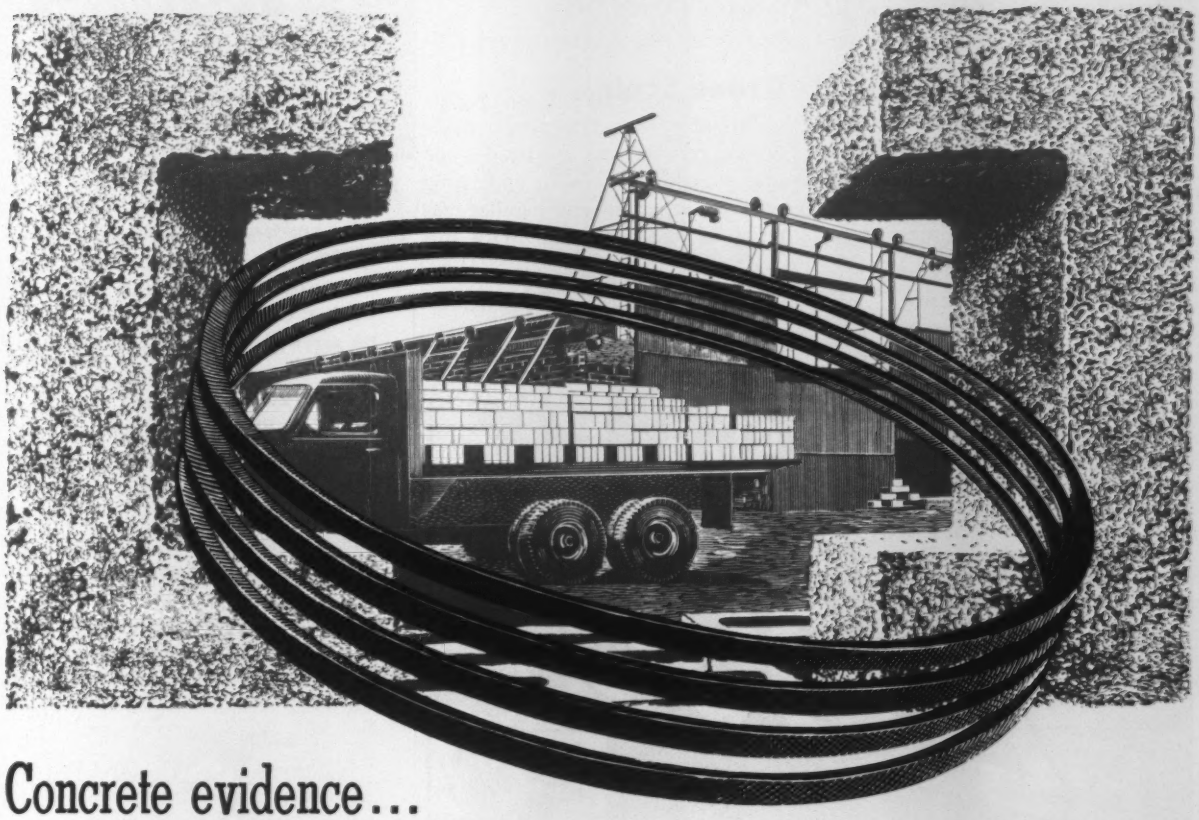


Heavy-Welded Sections Comprise Press

A 200-ton straightening press is stress relieved to provide maximum resistance to deflection under load. The press table is a steel weldment, machined to present a smooth pressing surface. A vane-type pump provides hydraulic pressure. A hand lever controls the press; it is connected to a 4-way valve which governs the direction of the oil flow between the pump and the cylinder. Stroke of the press is 18 in., daylight opening 18 in., gap 72 in., ram-pressing surface 24 x 6 in., and operating pressure is 2000 psi. Speeds are: advance 250 ipm, press 8 ipm, and return 86 ipm. Overall height of press is 15 ft. (Farrell-Birmingham Co., Inc.)

For more data circle No. 63 on postcard, p. 171

U. S. ROYAL V-BELTS from the Power Unlimited complete belt line



Concrete evidence...

balanced driving power pays off

Crushing rock for concrete block is, at best, a tough job. Stone dust and flying rock particles create unusually severe operating problems. (Our photographer actually found in-action photographs impractical because of the severity of these conditions.) Says Mr. Charles P. Lower, Jr., works manager of Bethayres Concrete Products, Bethayres, Pa., "The crusher is probably one of the toughest applications that can be found for any belt."

It is estimated that each of the six C-105 U. S. Royal V-Belts on the motor-to-crankshaft drive travels a distance of approximately 120,000 miles a year. Yet despite the severe abrasive atmosphere and the "occasional jamming" that takes place, these "U. S." V-Belts last *many years.*

The "balanced driving power" built into every U. S. Royal V-Belt . . . by specially developed equipment that automatically controls dimensions, weight, density, toughness, and tension members to give unequaled smoothness and length stability . . . has proved its value time and time again under every conceivable operating condition.

SEE HOW BALANCED DRIVING POWER CAN BENEFIT YOU BY CONTACTING YOUR "U. S." POWER TRANSMISSION DISTRIBUTOR FOR THE STOCKS AND SERVICE YOU NEED.

U. S. Royal V-Belts and engineering assistance for these drives supplied by "U. S." Distributor Lindsay-Oberholzer of Philadelphia, Pa.

Visit Booth 1324, Design Engineering Show, New York Coliseum, May 23-26.

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

Metal Polish

Providing a practical solution to problems of aluminum discoloration, pitting and corrosion, a polish cleans aluminum products to a mirror-like finish. In addition, the polish also cleans and gives a protective finish on other metals including copper, brass, silver, gold, pewter, nickel, chrome, and stainless steel. The finish lasts for months, and even stands up against salt spray. Harmless to skin, non-toxic, and non-flammable, the polish is easy to apply. (Anton Co.)

For more data circle No. 64 on postcard, p. 171

Crane Scale

Providing an economical, time-saving approach to overhead-crane scale weighing, a remote indicating crane scale weighs and handles material in one operation. With this system, the load element and indicator are separate units connected by up to 50 ft of flexible double-wire-braid hose. The indicator can be mounted at eye level where the operator can accurately read any load applied to the hook of the element. The element of the scale provides for automatic self-alignment under tension. This unit has a high safety factor. It has 360° calibration, and a 25-pct tare adjustment on a space-saving 12-in. dial. The system is available in capacities from 1000 to 60,000 lb. (Martin-Decker Corp.)

For more data circle No. 65 on postcard, p. 171

Removes Drills

Completely self-contained, a disintegrating machine cuts shaped holes in hardened metals. The machine also removes broken drills, taps, reamers, and studs. The unit has a steel cabinet mounted on ball-bearing wheels for complete portability. A Meehanite Tee-slot work

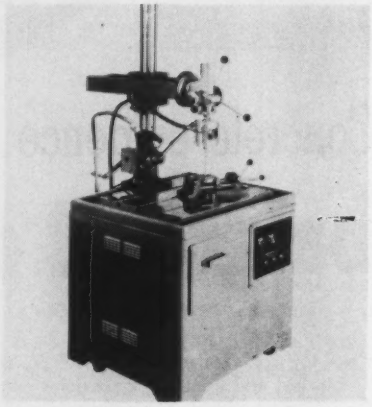


table is 25 x 30 in. and is for ½-in. "T" bolts. The electro-magnetic head travels by roller-bearing carriage on double tract of radial arm with finger-touch lock and movement control. (Jiffy Disintegrators, Inc.)

For more data circle No. 66 on postcard, p. 171

Geared Threader

Without changing dies, a geared threader threads 2½- to 4-in. pipe. Just one set of dies threads 2½, 3, 3½, and 4 in. The threader adjusts quickly for straight or tapered, over- and under-size threads. Ab-

SIMONDS

INDUSTRIAL CUT GEARS

LARGE OR SMALL HEAT TREATED OR PLAIN

SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

Custom GEAR CUTTING

SIMONDS' facilities can produce any type of custom gear from your blanks if you prefer. Same quality . . . same prompt service.

QUALITY GEARS FOR OVER 65 YEARS

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS WORM GEARS
RACKS PINIONS

Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

MEMBER OF AGMA

THE SIMONDS GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA

solutely jam proof, the threader features a time-saving cam-action workholder, which sets exactly to size by easy turning of the adjusting collar. (The Ridge Tool Co.)

For more data circle No. 67 on postcard, p. 171

Pot and Furnace

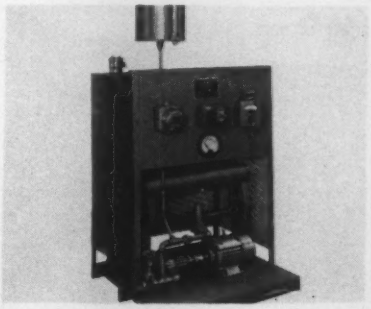
Fully insulated, a one-piece lead pot and furnace melts lead, solder, and babbit. The unit comes in three sizes, which have 25-, 45-, and 75-lb capacities. It uses less current than a flat iron, and does not affect other appliances or lights when in

use. Some of its advantages are: There is no fuel to carry, there is no flame, no smoke, no fumes, no noise, and can never run out of fuel in the middle of a job. The units plug into any outlet. (Maurice Fetterman Co.)

For more data circle No. 68 on postcard, p. 171

Controlled Heat

Designed and factory pre-wired for simple hook-up to process equipment, a series of automatic electric heat-transfer systems may



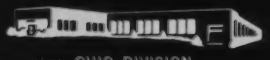
be used with all types of heat-transfer fluids. The electric units permit heating of liquids without elaborate, expensive and space - consuming

WHEN YOU NEED TUBULAR RIVETS

Milford's five manufacturing plants are within overnight trucking distance of your assembly line

NEW ENGLAND DIVISION
Milford, Connecticut (Trinity 8-4631)

PENN DIVISION
Hatboro, Pennsylvania (Osborn 5-4560)



OHIO DIVISION
Elyria, Ohio (Fairfax 3-3177)

ILLINOIS DIVISION
Aurora, Illinois (Twinoaks 2-4278)

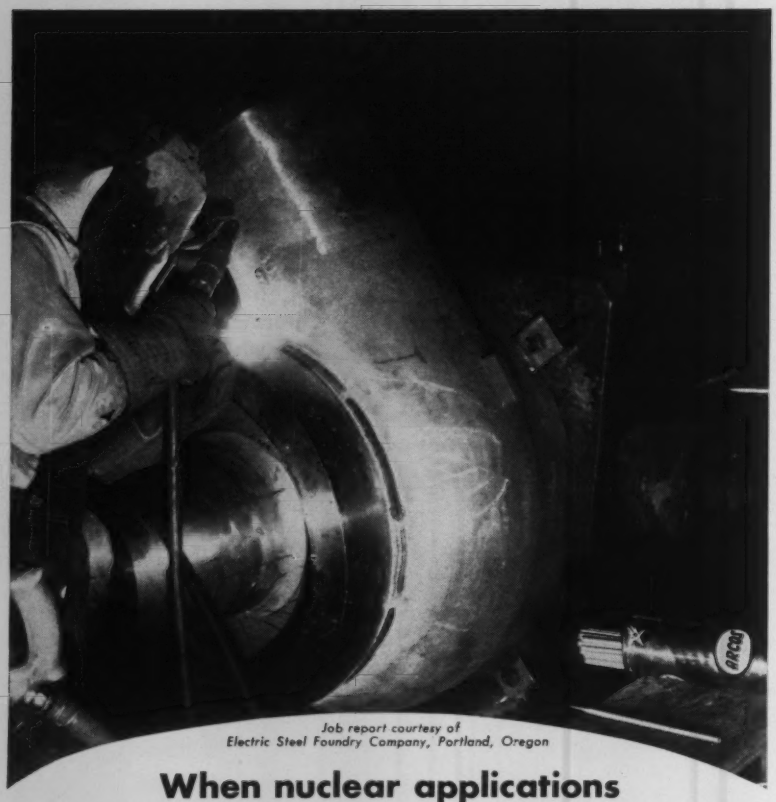
PACIFIC DIVISION
Norwalk, California (Oxbowl 3-3777)

Rivets can create "king-size" headaches when they aren't at your assembly line in the quantity you need—when you need them.

To give you unmatched delivery service on tubular rivets, Milford has five manufacturing plants and twenty sales offices strategically located across the country's industrial beltline. To cut delivery time and production costs, to improve product appearance, to assemble your product on automatic rivet-setting machines—get in touch with Milford.

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.



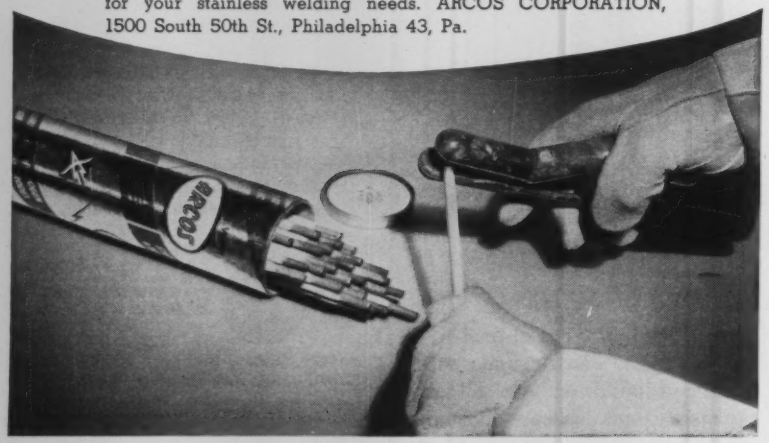
Job report courtesy of
Electric Steel Foundry Company, Portland, Oregon

When nuclear applications call for stainless welds of highest quality

WELD WITH ARCOS

STAINLESS ELECTRODES

This is part of a 3900 lb. stainless pump-volute casting for a submarine nuclear power plant. In the photo, a skirt is being welded to the casting using 5/32" dia. Arcos Chromend K Electrodes. To minimize stresses, a step-back and skip procedure was used. These welds conformed to Class I Navy radiographic standards—an indication of the dependability of standard Arcos electrodes for your stainless welding needs. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.

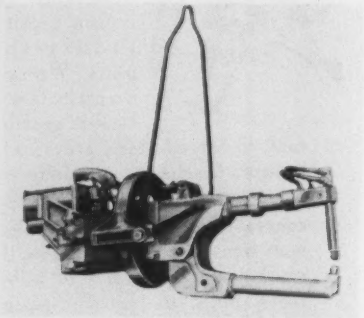


flame - heat - and - boiler facilities. Temperatures may be selected and accurately controlled anywhere from 100° up to 600°F. Built-in controls eliminate explosion or fire hazard. Kilowatt ratings range 4.5 to 80, with Btu output from 15,350 to 272,000. (Radcor, Inc.)

For more data circle No. 69 on postcard, p. 171

Welding Gun

Fully automatic, an air-operated, water-cooled spot welder provides 18,000 amps, 1350-lb pressure. It will weld from the lightest gage up

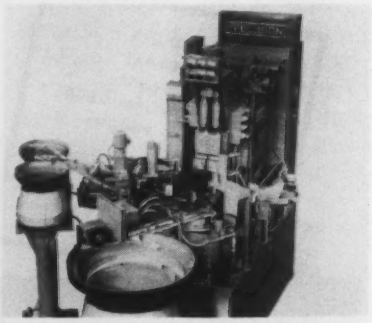


to 2 x 3/16 in. This portable welder has gyroscopic suspension for easy rotation in all directions. (Guthery Machine Tool Corp.)

For more data circle No. 70 on postcard, p. 171

Welding Machine

Designed for mass - production welding of small parts, a line of dial-feed welding machines has six-station Geneva dial-feed mechan-



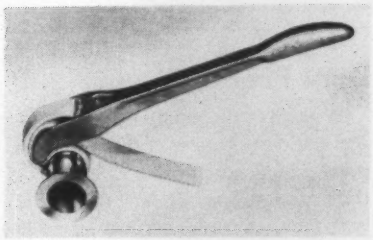
isms. These machines are particularly suited to the high-speed assembly of small electrical components. The machines can be equipped with tooling to satisfy forming, assembling, and fastening

requirements for a tremendous variety of parts in many industries. (Precision Welder & Flexopress Corp.)

For more data circle No. 71 on postcard, p. 171

Strap Wrench

Delicate or highly-polished materials, cylinders, knurled knobs and odd-shaped parts can be safely turned or adjusted with a new strap wrench. The fabric strap has a soft,



firm grip that prevents scratching, denting, or crushing. A new, lightweight handle is shaped to fit comfortably into the operator's hand. (Lowell-Wrench Co.)

For more data circle No. 72 on postcard, p. 171

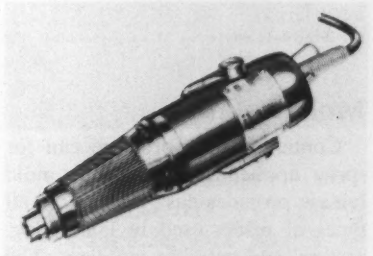
Finds Fault

Weighing only 18 lb, a fault finder can locate a fault in 20 minutes, without shutting down production. The device is a combination ground detector and fault finder. The unit quickly locates accidental grounds on power systems, both ac and dc, up to 600 v, while the system is energized. The device is easily operated by one man. (Parr Mfg. Corp.)

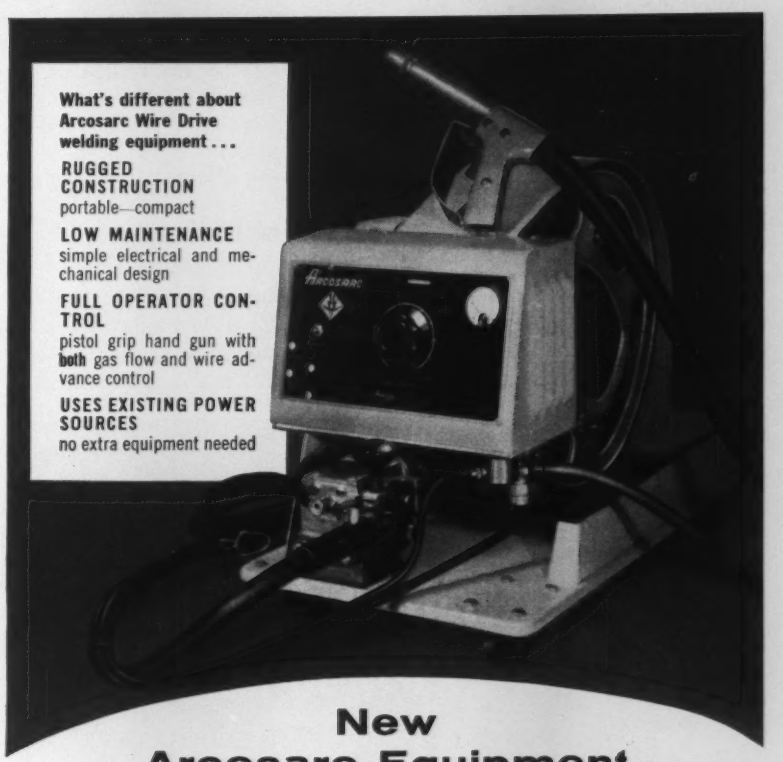
For more data circle No. 73 on postcard, p. 171

Hand Grinder

A high-speed hand grinder offers full-load grinding power. The



grinder has a rating of ¼ hp, a no-load speed of 35,000 rpm; it features sealed-for-life bearing lu-


What's different about Arcosarc Wire Drive welding equipment . . .
RUGGED CONSTRUCTION
portable—compact
LOW MAINTENANCE
simple electrical and mechanical design
FULL OPERATOR CONTROL
pistol grip hand gun with both gas flow and wire advance control
USES EXISTING POWER SOURCES
no extra equipment needed

New Arcosarc Equipment

—for CO_2 welding of Mild and Low Alloy Steels

—for inert gas welding of Aluminum and Stainless

Here is a "bonus producing" wire feed unit for a variety of welding jobs in pipe, pressure vessel, structural steel fabricating shops, and foundries. Full instant control in the hand gun of the wire feed and gas flow along with the open arc give the welder the fullest opportunity to produce high quality weld metal consistently. Continuously fed wire eliminates stub losses, and the inconvenience of start and stop procedures. For the welder, ARCOSARC equipment improves manual operation; for the fabricator, it helps to keep costs under control.

WELD WITH ARCOS

ELECTRODES • WIRE • FLUXES
SEMI-AUTOMATIC AND AUTOMATIC EQUIPMENT FOR WELDING
STAINLESS • LOW ALLOY • ALUMINUM • MILD STEEL

ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pa.

brication, metal seals to protect bearings from dirt and abrasives, and smooth operation. Weighing 3¾ lb, the grinder measures 10 in. in length. (The Dumore Co.)

For more data circle No. 74 on postcard, p. 171

Dowel-Pin Kit

Containing 10 each of the 16 most-used sizes of dowel pins, a dowel-pin assortment kit eliminates time-consuming trips to the stock room. The kit puts a complete "stockroom" at the bench. A diagram in the box lid shows the location of each size. (The Producto Machine Co.)

For more data circle No. 75 on postcard, p. 171

Vertical Mixer

Receiving and discharging materials by air, a 200-cu ft vertical mixer features a dust-tight paddle discharge gate. The gate is located at the extreme lower end of the mixer cone. The positioning of this gate, flush with the bottom of the mixer, gives this new design superior discharging qualities. Conveying air, entering the mixer through the top, is released through a vent. The vent may be connected to a bag or complete dust-control system. An elevating tube and patented baffle mixes the material thoroughly. The mixer is mounted on steel framework. (Sprout, Waldron & Co.)

For more data circle No. 76 on postcard, p. 171

The revolutionary Bliss Pulsation Burner

produces temperatures never before achieved with oil or natural gas. Burning oil, it can reach a searing 3450°F. On 1000 BTU/cu. ft. natural gas, it develops 3320°F. Both these extremely high temperatures are close to the theoretical limits for these two fuels. Foundries, smelters, heat treaters and other metal processers have been quick to take advantage of the remarkable combustion efficiency of these new burners. To them, it has meant faster heating cycles, cleaner flue gases, and above all, fuel economy that cuts from 12% to 30% from their furnace overhead. Not to speak of reduced maintenance on refractory linings.

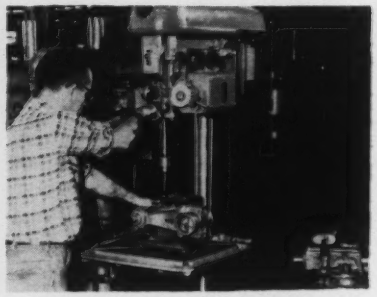
To learn how the Bliss Burner can increase the heat output in your plant while it's saving you money in fuel and furnace maintenance, write today for our Bulletin No. 60. It's yours for the asking.

BLISS SINCE 1857

E. W. BLISS COMPANY
Canton, Ohio
BLISS is more than a name—it's a guarantee

Drill Presses

With up-front controls permitting one-hand operation, a line of 20-in. power feed drill presses combines the adaptability of a power tool with the ruggedness and capacity of a machine tool. The drill press limits the operator's work to loading, unloading and actuating the tool. Power feed also improves quality of drilling. The press can



easily be set up for production operations along the production line, or set up to operate with other tools to combine production operations. The power feed tool also features a full 6-in. spindle travel providing ample capacity for drilling, counterboring, and reaming of large work. (Rockwell Mfg. Co., Delta Power Tool Div.)

For more data circle No. 77 on postcard, p. 171

Mold Release

Contained in a pressure can for spray application, a silicone mold release provides easy parting for all types of resins used in laminating, casting, and pressure molding. The mold release is heat-stable, oxidation resistant and virtually nonvolatile. It is highly efficient on pre-

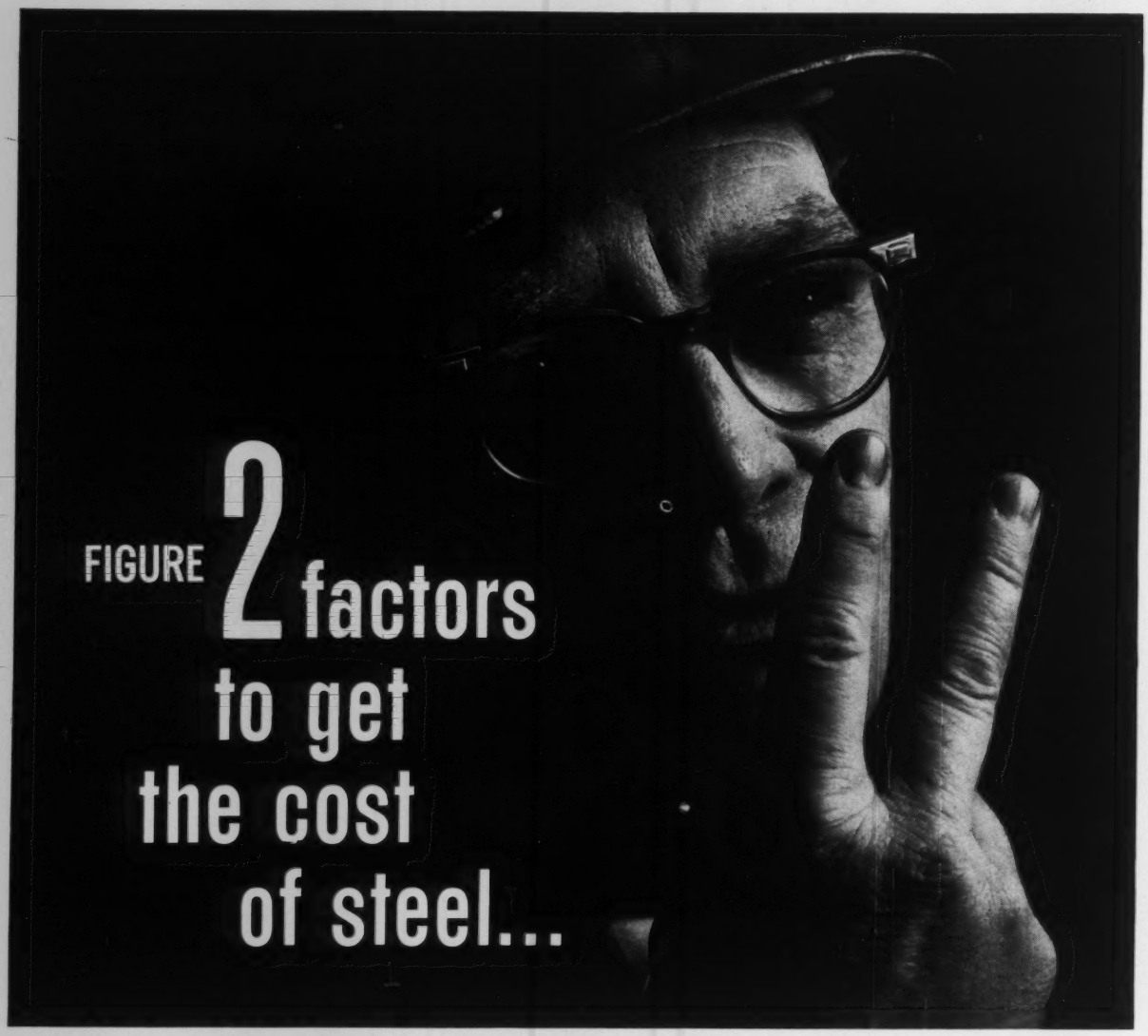
Roebling Tire Bead Wire: Packaged for Maximum Benefit

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation



COST OF POSSESSION is an important addition to price!

What are the costs of possession when you put steel in inventory? Many are hidden. Run your eye down the chart at the right . . . it will help you find them.

Many smart, well-informed steel users find they save money by using the stocks, facilities and technical knowledge of their Steel Service Centers. They deliver steel when you want it, cut to exact size, ready for use. Your capital is freed for more profitable use.

Compare *all* of your costs, including *cost of possession*, with the price and *freedom from risk* of buying steel from your Steel Service Center. Get the booklet, *What's Your Real Cost of Possession for Steel?* from your nearby Steel Service Center. Or write to Steel Service Center Institute, Inc., 540-D Terminal Tower, Cleveland 13, Ohio.

COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	_____
Cost of capital:	
Inventory	_____
Space	_____
Equipment	_____
Cost of operation:	
Space	_____
Materials handling	_____
Cutting & burning	_____
Scrap & wastage	_____
Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

Per ton, cut-to-size, and delivered

TOTAL _____

STEEL SERVICE CENTER INSTITUTE

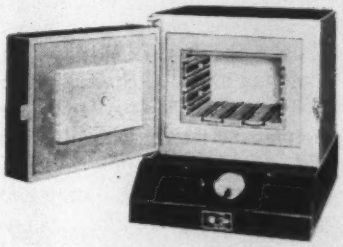
. . . YOUR STEEL SERVICE CENTER

pared non-metallic surfaces and metallic surfaces up to 500°F. The parting agent gives clean, easy release—resulting in improved surface finish—to a wide variety of plastics, including epoxy, melamine, and phenolic resins. (Hastings Plastics, Inc.)

For more data circle No. 78 on postcard, p. 171

Industrial Furnaces

Featuring infinite zone control up to 2300°F, an industrial electric furnace has a temperature-indicating pyrometer, two thermocouples and selector switch. The furnace also features refractory element holders, which insure excellent distribution of radiation, and require



25-pct less input to reach any given temperature. This front-loading bench model measures 20½ x 19 x 24 in., outside dimensions. The unit also has high-quality firebrick, two-tone heat-resistant paint, cold-rolled steel case. (L & L Mfg. Co.)

For more data circle No. 79 on postcard, p. 171

Upender

For simplifying handling and upending coiled-strip metal stock, an upending machine solves handling problems involved when metal coils are delivered flat to fabricating plants. The coil is slid off the truck onto the machine which then turns the axis through 90°, so as to place the coil in a vertical position. This position permits transportation of the coil by a bar- or mandrel-equipped lift truck or similar device. Minimum electric power is required for the drive motor. The unit can also be used to store coils with axis vertical, thus eliminating

You never forget weekly, semi-monthly or monthly lubrication and inspection when Acme Visible is on guard. Maintenance, repair and parts records for each machine are a unit. Therefore all pertinent facts are together. And each unit carries colored signals that flag your eye when it's time to act. Result, far less down time. More production. Send for facts.

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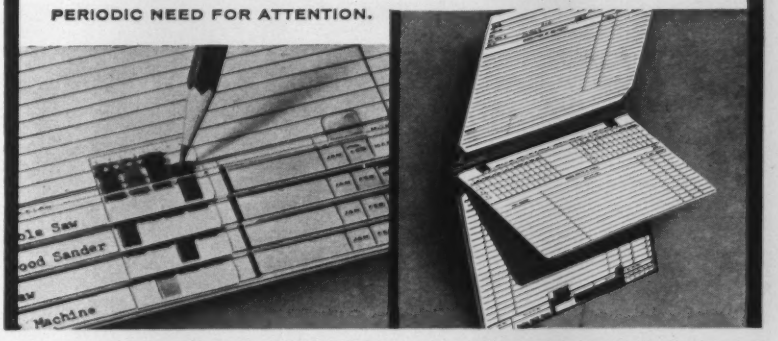

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mass produce any shape
...Copy directly from your master

Quickly— Easily— Economically does

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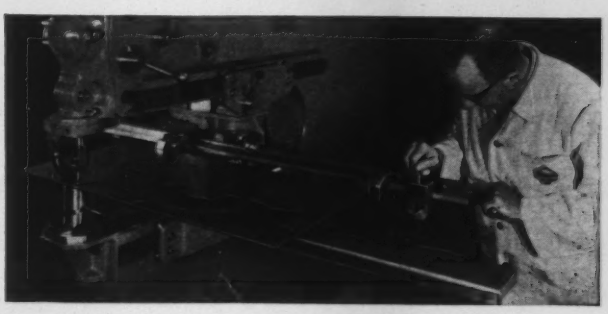
- Folding
- Shearing
- Slotting
- Flanging
- Louver Cutting



Eliminate high tooling costs:

Sheetmetal is firmly clamped and guided by roller-bearing coordinates as operator effortlessly feeds tracer along template contours. Built-in rulers quickly position sheet for rectangular cuts. Circular cuts to 24" diameter are made through a special swivel ruler.

All-side-cutting punch pierces its own starting hole—cuts in any direction without distortion. Copy nibbles up to 9 gage steel—regular nibbling up to 0.20" steel—shears up to ¼" steel.

Steplessly adjustable stroke and stroke position. Three models—throat depths 41", 49" and 59". Universal forming attachments available.

Write for further information! — Dealer inquiries invited!

COSA

SEE Trumpf Nibblers at the WELDING SHOW
Booth 111 • Los Angeles • April 26-28th
COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

space-wasting pyramiding. The machine comes in many different sizes to suit all coils. (Roth Corp.)

For more data circle No. 80 on postcard, p. 171

Hydraulic Hand Pump

A compact, midget hydraulic hand pump develops a full 8650 psi. The pump is 14-5/16 in. long, and has an oil capacity of 13.5 cu in. Piston area is 0.110 sq in., diameter is ⅜ in. and stroke 9/16 in., displacing 0.0621 cu in. Hose outlet is tapped ¼-in. NPT. The pump provides fast and efficient operation for the new company 2- and 4-ton capacity single-cylinder rams. (Owatonna Tool Co.)

For more data circle No. 81 on postcard, p. 171

Conveyor Units

Wherever rapid, efficient loading and unloading is desired, conveyors with retractable booms will do the job. These booms can be extended into trucks and trailers as loads are removed, or withdrawn as packages are stacked forward. The specialized conveyor units consist of a stationary base unit and an extendable, self-powered boom whose movements are easily controlled by only one man unloading or loading at the end. Boom speed is a constant 19 fpm, but belt speed is variable within three ranges—10-30, 13-40, or 16-48 fpm, depending upon the model. The units are available in widths from 18 to 48 in., and overall lengths from 33½ to 57½ ft. (Samuel Olson Mfg. Co., Inc.)

For more data circle No. 82 on postcard, p. 171

Drum Dumper

Designed to operate at lifting heights from 12 in. up to 50 ft, a line of steel-drum dumpers empties the drum's contents into mixers, tanks, tumblers, chutes, conveyors, and hoppers. Manual labor is kept to a minimum. Rated capacities are from 100 to 5000 lb, dependent upon unit selected. The dumper handles powders, granulars, ceramics, stampings, castings, scrap and liquid of heavy viscosity. (Conveyors & Dumpers, Inc., Div. of Mercury Industries)

For more data circle No. 83 on postcard, p. 171

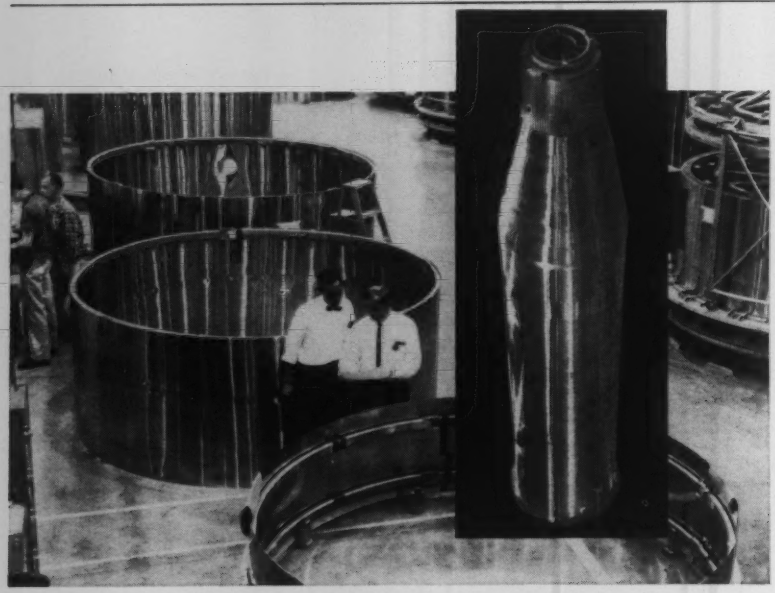
Positioners

Heavy-duty, geared elevation head and tailstock positioners find use for positioning weldments such as freight and piggy-back cars for down-hand welding. Low horizontal axis height keeps weldment near floor, while elevation feature enables clearance for indexing. All models have a hollow spindle to allow for the passage of cables, gases or fixturing. Capacities are 6 to 120 tons. (Aronson Machine Co., Inc.)

For more data circle No. 84 on postcard, p. 171

Washing Machine

Used for the inter-process cleaning of small stamped and forged parts, a vertical conveyor-type washing machine washes a 300- to



"the life of an ATLAS tank section begins in the town of Washington, Pa.

. . . where the Washington Steel Corporation produces thin-gauge Stainless Steel in long, flexible bands about a yard wide."*

Washington Steel Corporation is the exclusive supplier of stainless skin for the ATLAS program for a very good reason: it has been able to meet the exacting specifications laid down for this specific undertaking.

Washington Steel Corporation is the pioneer in precision-rolling of light gauge stainless sheets by the Sendzimir process.

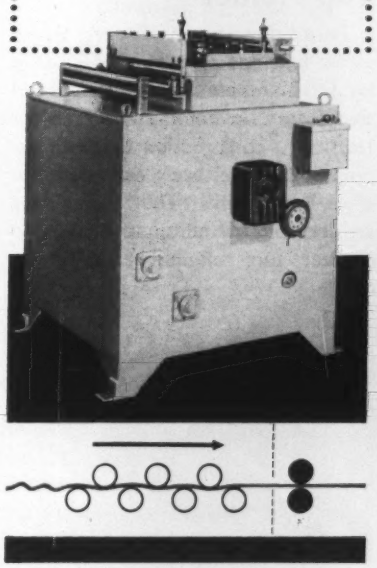
*ATLAS—The Story of a Missile
by John L. Chapman, ©1960

WASHINGTON STEEL CORPORATION
4-L WOODLAND AVENUE WASHINGTON, PA.

new

benchmaster

Combination Feeding and Straightening Machine



Feeds measured lengths of coiled, strip or flat stock to presses, shears and other machines. Simultaneously removes kinks, moderate curl, camber, etc., with 9 adjustable power-driven rolls. Equipped with electro-magnetic clutch drive and adjustable timer for delivering measured feed lengths.

TWO MODELS: Single clutch for nominal feed accuracy or double clutch for increased feed accuracy. Standard feed range 0-60". Alternate ranges on request. Special timer bypass extends range to any length required. Models available for material to 50" wide, various gauges. Larger sizes are available on special order.

WRITE FOR NEW DESCRIPTIVE CIRCULAR!

benchmaster

World's largest manufacturer of small punch presses and mills.

1835 West Rosecrans Avenue, Gardena, Calif.

1500-lb work load each hour. With its 11-ft vertical conveyor, only 16 sq ft of floor space is required. Parts are received a few feet above floor level, and are given a thorough spray cleaning as they are conveyed upward to the end of the conveyor where they are discharged. (Ransohoff, Inc.)

For more data circle No. 85 on postcard, p. 171

Strapping Machine

Many industrial and commercial packaging operations are suited to a new lightweight, powered round-steel-strapping machine. Available in either electric or air-driven

models, the tool weighs 14 lb. It uses 15- to 19½-gage round-steel strapping directly from a reel, without prior strap preparation. (United States Steel Corp.)

For more data circle No. 86 on postcard, p. 171

Furnace-Gas Analyzer

A furnace-atmosphere analyzer affords completely-automatic analysis of selected components in furnace atmosphere, flue gases, and controlled atmosphere. The rugged, process-gas chromatography instrument performs an automatic four-component analytical cycle every ten minutes. Applications include heat-treat furnaces, endothermic gas generators, kilns, and other combustion devices. The unit is easily installed and requires little maintenance. (Perkin-Elmer Corp.)

For more data circle No. 87 on postcard, p. 171

Full-View Grinding

Special fiber-backed abrasive disks, with two parallel straight sides, permit disk-grinding to be

ALL-STATE ALLOYS & FLUXES

NOW—join any commercial metal to any other

All-State provides the right alloy, right finish, right flux, and the right service so you can join any commercial metal to any other—on production line or in maintenance.

If you have a welding, brazing or soldering problem (automatic or manual) there is an answer among All-State's specially produced alloys and fluxes.

This answer may be as near as the nearest of over 1000 All-State distributors here and abroad. Or just write or phone (WHite Plains 8-4646) our Technical Department and Laboratories, White Plains, N. Y. A few minutes and a few pennies might save you thousands of dollars.

To help you know the line and select the alloy and flux best suited for each job, All-State publishes a 56-page INSTRUCTION MANUAL, free to interested users. Also, a special ALUMINUM MANUAL containing 36 pages of data on aluminum alloys and how to join them. If you work with aluminum, ask for a copy.

To serve you, All-State maintains 3 factories, 4 warehouses (White Plains, N. Y.—St. Louis, Missouri—South Gate, California—Toronto, Ontario, Canada) and a central Technical Department and Laboratory at headquarters.

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WHITE PLAINS, NEW YORK
VISIT OUR BOOTH 501 AT THE WELDING SHOW

performed with the work-point in full view of the operator. The disk is a rectangular section with a radius at each end. As this "disk" rotates, a full inch at its outer edge —where all disk-grinding is done— becomes transparent. Contour work and blending of welds can be done with complete accuracy. Because the actual grinding is intermittent, the metal remains cool. The "disks" are available in 7- and 9-in. sizes. (Behr-Manning Co.)

For more data circle No. 88 on postcard, p. 171

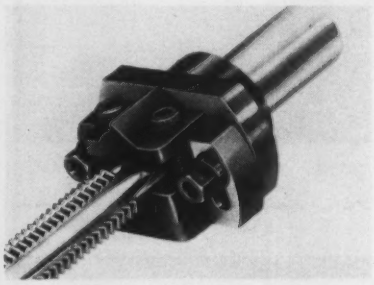
Degausser

An automatic degausser erases a reel of recorded-to-saturation instrumentation tape to at least 50 db below normal record level. The degausser can be used with tapes from ¼ to 2 in. in width, reels from 7 to 14 in. in diam, and reel hubs of all dimensions. Uniform degaussing is achieved with automatic time cycling of reels in the magnetic field. The degaussing cycle is completed in about 60 seconds. Heavy-duty coils, excited by conventional 117-v 60-cycle current, provide the erasing field. The unit weighs about 80 lb, and measures 15 x 16 x 22 in. (Consolidated Electrodynamics Corp.)

For more data circle No. 89 on postcard, p. 171

Tap Holder

Permitting much faster, easier screw machine set ups, a V-jaw tap holder eliminates bushings and reduces tool inventory. The holder features a construction that will accommodate either extended or close-held taps. The slip-in tap holder offers automatic, axially-perfect tool alignment. Uniform



seating is maintained, and the tap is firmly secure. The holder also features a spring return assembly, totally enclosed to prevent chips or dirt from snagging the free float of the axial movement control spring. All working surfaces of the holder are hardened and ground to precise tolerances. (Brookfield, Inc.)

For more data circle No. 90 on postcard, p. 171

Inspection Instrument

The location of small slots and holes, in long parts, can be measured to less than a tenth accuracy with a new inspection instrument. The device inspects hole location and center distance, slot width, and depth of various-shaped cavities in rectangular and round parts of various thicknesses and widths up to 12-in. long. The gage consists of a precision-built gage table and a three-column instrument. Slot depth is checked with a contact-type gage stylus. (The Sheffield Corp.)

For more data circle No. 91 on postcard, p. 171

IT PAYS TO SEND YOUR FASTENER SPECIFICATIONS TO SPECIALISTS . . .

ERIE BOLTS • STUDS • CAP SCREWS • NUTS
In Alloys • Stainless • Carbon • Bronze

The quality of your equipment can be no better than the quality of its smallest component . . . one of many reasons why it pays to send your fastener specifications to ERIE specialists. Here your specifications are produced with watchmaker's precision by craftsmen whose sole business for almost half a century has been the production of fasteners to customer, government or national standards . . . fasteners for railroads, refineries, diesels, farm and earth moving equipment and other heavy machinery. *Be sure* . . . send your fastener specifications to ERIE specialists.

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NEW FILMS

"A Civilization May Be Measured by the Tools with Which it Builds." The title presents the theme of a new film which was made for The Steel Co. of Canada. This film takes us colorfully back to prehistoric times. It shows us, through paintings, the hardships endured by stone-age man. Then, it shows the discovery of iron. The film carries this discovery through to the development and increased use of steel in the 19th and 20th centuries. 24 minutes. 16mm. color, sound. Crawley Films Ltd., 19 Fairmont Ave., Ottawa, Canada.

"Malleable Castings Straightened by Impact" illustrates the application of a Chambersburg Cecostamp in restrike operations in a malleable foundry. The machine is an air-operated drop stamp that has already been adapted for this purpose by seven well-known malleable foundries. The film shows, through demonstrations, that distortion or warpage from annealing can be corrected quickly. Restrike not only corrects warpage, but also coins to close tolerances—often eliminating subsequent machining. Chambersburg Engineering Co., Chambersburg, Pa.

"Steel Belt Conveyors" illustrates and describes many of the uses of steel belt-type conveyors. The film shows steel belt conveyors handling iron ores, clay, sugar, ice cream, coal, engine pistons, human passengers and many other applications. The belts are shown in warehousing, production, processing, shipping, receiving, sorting and related stages. Also demonstrated is the ease with which the belts are cleaned and their resistance to wear and abrasion. 30 minutes. 16mm sound. Sandvik Steel Belt Conveyors Div., Sandvik Steel, Inc., 1702 Nevins Rd., Fair Lawn, N. J.

800 to 1 hp favorites for quiet operation, low maintenance and long-life service . . .

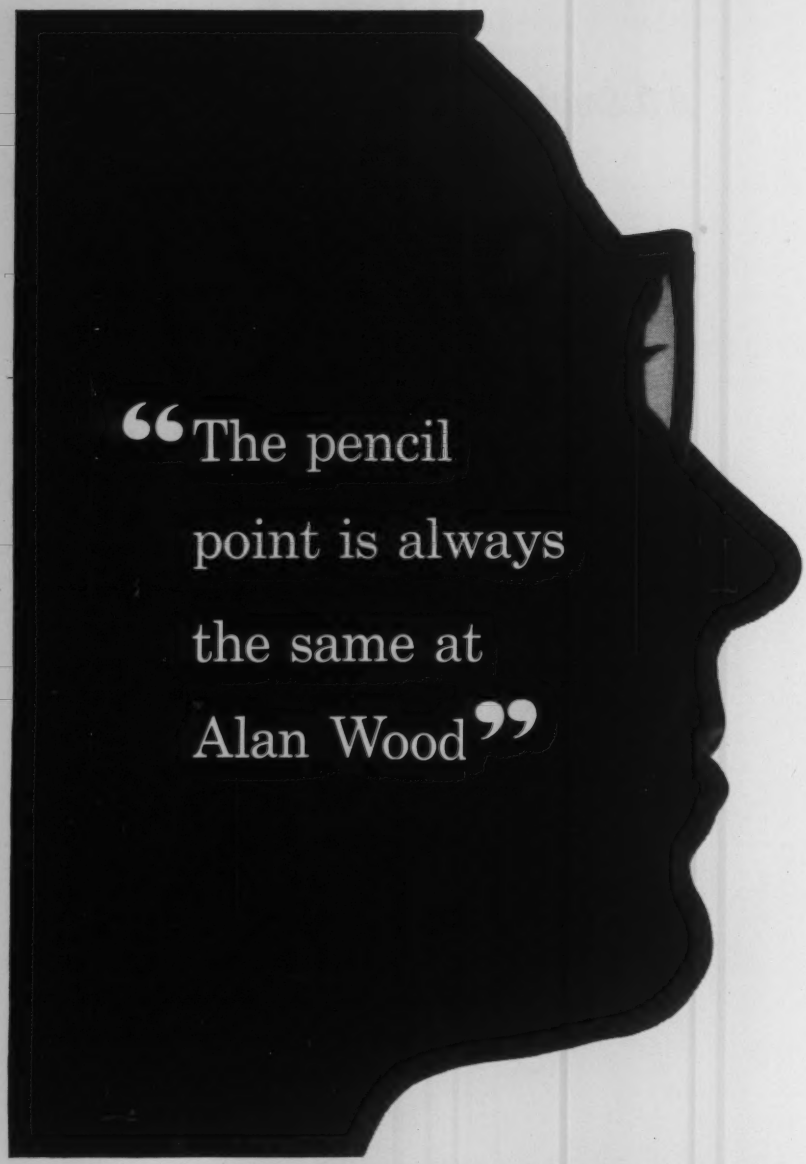
From the case of the A. O. Smith Motor Man — a complete stable of integrals that include single-phase models (1-5 hp) or polyphase (1-800 hp). Also a team of fractional-hp motors. All are sure bets to give top performance over the long, long haul.

And there's an A. O. Smith Motor Man near you — chomping at the bit to give you 24-hour action on all parts and service orders.

NEW: "Big" drilling jobs made easy

This custom "radial drill" is provided by combining standard Delta drill press components—a ball bearing traveling carriage, column, raising mechanism and choice of four Delta 20" drill heads. Mounted on an overhead track, it handles jobs too big for conventional drilling—in production runs too small to justify expensive, special tooling.

Another example of how rugged, versatile, and highly accurate Delta Industrial Tools are being used to replace costly conventional tooling. For illustrated booklet of cost-cutting ideas, write: Rockwell Manufacturing Company, Delta Power Tool Division, 640D N. Lexington Ave., Pittsburgh 8, Pa. In Canada, Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.



"Doing business with Alan Wood, we never have to worry about variations in pricing policy. Whether steel is short or plentiful, the pencil point is always the same."

That's the way one Alan Wood customer said it, and we appreciate the acknowledgement. We do believe in consistent pricing policy. Moreover, Alan Wood is geared to give your order prompt attention without red tape delays. Your quality goes up, your costs and rejects go down, when you use dependable Alan Wood plate, sheet and strip.

When your metallurgical requirements need speedy, reliable analysis, ask for an Alan Wood study. Your Alan Wood representative is always available, ready to help.

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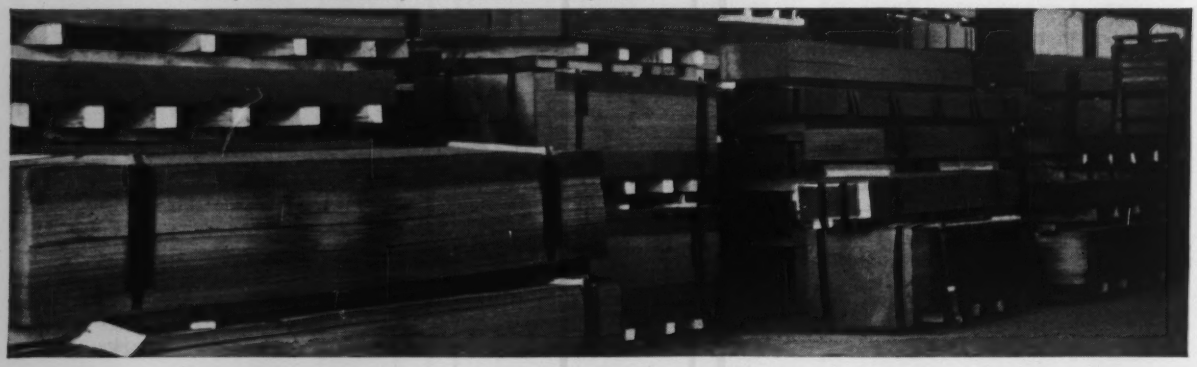


The Iron Age Summary

Cancellations Hit Bottom

Volume of incoming orders is close to bottom, and cancellations have hit bottom.

An order improvement seems certain in the near future. But it will be a statistical upturn, not a basic trend.

■ The shape as well as the size of the year seems to have changed for the steel industry. Shipments will be smaller than anticipated. But they'll be better balanced between the first and second half.

Originally, the first half was supposed to be strong and a steady tapering off was expected in the second half. Now the steel industry is witnessing a leveling off in the volume of shipments, backlogs and new orders.

Orders Reflect Use — Hand-to-mouth buying in steel has been present for the past two or three weeks. This trend will become widespread in the industry as steel backlogs vanish and as steel shipments get in line with new orders and steel consumption.

Consumption-order balance will become apparent within the next month or two. While the volume of incoming orders is close to bottom, cancellations have hit bottom and are now at a normal rate.

An order improvement seems certain in the near future, but inventory building has ended. The improvement will be a statistical upturn, not a basic trend. Incoming orders will reflect more than at any time in the recent past actual steel consumption.

Stockpiling Ends — Some large rush orders can be expected from automakers, but this won't be due to the seasonal spurt in car sales. Automakers already have enough steel on hand or on order to take care of present model runs. New orders will be for steel to balance inventories.

Major users have all the inventory they expect to pile up. Customers are now demanding quick delivery. These demands are coming from appliance makers, farm implement makers, and miscellaneous users, as well as automakers. In fact, just about everyone who wants a few tons of steel is demanding red-carpet treatment.

This would indicate the inventory cutoff was more abrupt than anticipated. Inventory liquidation in the second quarter could cause a substantial drop in the steel operating rate. Broad trends now suggest an average operating rate below 80 pct for the second quarter, and close to 70 pct for the third quarter.

Fall Upturn?—But, barring a recession, there could be a revival in the fall. Steel users will enter the last half of the year with balanced but low inventories. No increase in consumption can be expected during the summer months because of seasonal factors, vacation schedules.

However, a seasonal pickup in the fall would have to be accompanied by inventory building. For this reason, many steel marketing men predict a fourth quarter operating rate ranging from 75 pct to 85 pct.

Others, however, favor the lower figure. They point out that steel is currently being consumed at the equivalent of 70 pct to 75 pct of capacity. At this rate inventory can be added without the mills going over 80 pct of capacity.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,305	2,225	2,597	2,646
Ingot Index				
(1947-1949=100)	143.5	138.5	161.7	164.7
Operating Rates				
North East Eost	81.0	79.0	86.0	96.0
Buffalo	86.0	88.0*	103.0	97.0
Pittsburgh	81.0	79.0*	90.0	94.0
Youngstown	63.0	64.0*	81.0	87.0
Cleveland	88.0	90.0*	103.0	94.0
Detroit	89.0	52.0*	105.0	101.0
Chicago	87.0	86.0*	97.0	92.0
Cincinnati	95.0	100.0*	103.0	89.0
St. Louis	93.0	85.0*	96.0	109.0
South	80.0	76.0*	89.0	92.0
West	76.0	72.0*	76.0	95.0
U. S. Rate	80.9	78.1	91.1	93.5

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$33.50	$33.50	$33.33	$34.83
No. 2 bundles	$22.83	$23.00	$22.67	$23.17
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.30
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.00	99.375	99.875	102.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Buyers Look for "Total Value"

General Electric joins value analysis and vendor "added value" appraisal in buying approach called Productive Purchasing.

"Horseback judgment" in evaluating vendor services and capabilities is not enough.

▪ Purchasing agents have a new signpost on the road to maximum value. Name on the sign: Productive Purchasing. This is the term used by General Electric Co. for their new systematic approach to finding "total value" in industrial buying.

Value analysis, long an effective technique for uncovering maximum value in product buying, does not go far enough, according to GE. What is needed additionally, says the company, is a scientific approach to evaluating **suppliers.**

Says GE: "The success of purchasing agents in systematically appraising product value has resulted in many probings into the broader area of systematically appraising the capabilities and services of suppliers. Productive Purchasing is the name given to this broader concept."

Added Values—Productive purchasing includes product value analysis. It also extends the systematic approach of value analysis in appraising vendor "added values." Added values may include, for example, quality control, prompt delivery, application engineering, after-sale service, and product innovation.

Total Value—By now adding to product value analysis a scientific approach to appraisal of supplier added values, GE proposes the formula for Productive Purchasing: Product Value + Added Value = Total Value.

Checklist Used — GE uses a checklist in appraising added values (see table). Six main headings are used by GE in taking a hard look at competing suppliers: Reliability, Technical Capabilities, After-Sale Service, Availability, Buying Convenience, and Sales Assistance. But additional items should be added to the list according to the needs of individual companies.

In assigning point values in the checklist, GE cautions its buyers to consider not only the quality and extent of vendor capabilities, but also the need or desirability to GE of such values.

Must Organize—While GE sees the scientific appraisal of product values and added values as a major part of productive purchasing, they emphasize, "the program is not complete until purchasing is organized to take full advantage of the appraisal techniques."

There are two areas involved in organizing for Productive Purchasing; integrating purchasing effort with other functions of the business, and streamlining purchasing procedures to free the purchasing operation from detail.

Many of a company's needs in product values and added values, says GE, can best be determined by people in other areas of the business.

Examples of Added Value

Technical Capabilities	Need or Desirability	Supplier A	Supplier B
Does supplier have a program of creative product development or materials improvement? What are his past results?	5	5	5
Will supplier provide application engineering assistance?	5	5	5
Will supplier provide installation and service engineering assistance?	10	10	5
After-Sale Service			
Does supplier have a service shop organization available when and where I may need it?	10	8	10
Is emergency service available?	10	10	10
Is the supplier's after-sale service dependable and reasonably priced?	8	8	6
Will renewal parts be available when I need them?	10	10	5

Thompson Ramo Wooldridge Inc.
DAGE TELEVISION DIVISION
2104 W. 10th Street, Michigan City, Indiana

CALL REPORT MEMO

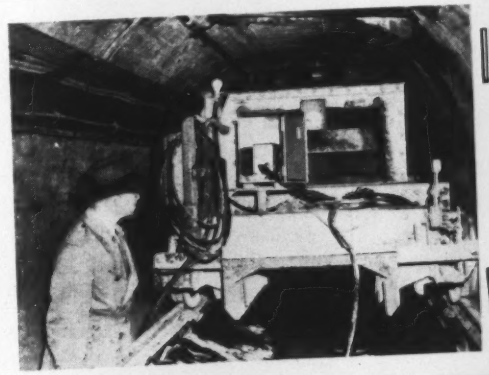
TO: T.R. Williams, Sales Manager

FROM: David Gentry, Midwest Rep.

The attached photo was taken in the loading tunnel of The Construction Aggregates Corporation's Ferrysburg, Mich. plant. It shows one of the shuttle cars (they serve as feeders for the various aggregate mixes from storage tanks above ground level) equipped with a Dage Model 63A TV camera. With this set-up, one operator in a control center can watch and control the action of five TV equipped cars.

This is a prime example of how Dage TV serves as the eyes of automation in a materials handling situation. It's paying off here in increased production at lower cost; elimination of potential safety hazards and it's providing centralized control.

By the way, our new RGS-10 ruggedized camera looks great for any industrial use. I will be demonstrating it at a chemical plant and a steel mill next week. Full report to follow.



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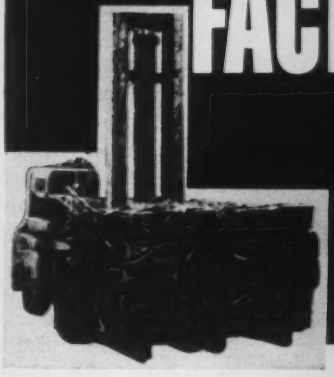

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Quick Deliveries Are Now Routine

Just about all steel products can usually be delivered in three weeks or less.

Mills are building inventories and stepping up order operations so they can make fast shipments.

■ Purchasing agents are in the driver's seat on every major steel mill product for the first time since the strike build-up started early last year. Three-week delivery can be had on almost every major product if a buyer is willing to shop around for mills with semi-finished material in the right size and shape. Most are doing just that in filling inventory holes. Mills are played against each other and the best delivery gets the order.

The wave of cancellations has subsided on most products. Now comes the flurry of small orders where inventory has been cut back too far. Mills are getting ready for this by starting to rebuild in-plant inventories for fast shipments. They are perking up their order departments and paying closer attention to prompt delivery.

Sheet and Strip — Cold-rolled sheet is one of the few products with a backlog and this will hold production up well through May. Although normally a 6-week lead time product, deliveries in three weeks can be made on standard sizes if slabs are on hand. In **Pittsburgh,** cold-rolled is the brightest spot in a generally slow market. May production will be good, but a drop-off is expected in June.

In **Pittsburgh** and **Cleveland,** wide sheet mills are getting some business as a result of the strike at Great Lakes Steel Co. **Eastern** mills are now pushing into the **Chicago** area for orders but are not doing much better than the local producers. Deliveries are as short as three weeks. Some imported cold-rolled sheet in **Chicago** is going for $30 a ton under domestic prices.

Hot-rolled sheet is turning into a glut on the market. Imported hot-rolled sheet is still hanging over the market in **Detroit** and going at distress prices.

Bars — Cancellations and set backs have finally stopped and competition on deliveries is starting. In **Pittsburgh,** producers look for May to be slower than April. It will have to stand on new business which won't come in until the month has started. In **Chicago,** mills are offering deliveries of hot-rolled officially at four weeks but can be pushed to do better. Mills are at 16 turns and less.

Cold-finished has a better market tone with May orders indicating second quarter operations will be within 10 percentage points of April. In **Cleveland,** auto forgers are still going fairly strong, working off auto releases which are continually changing. May production is expected to be about 70 to 75 pct of capacity compared to about 80 pct for April.

Plate and Structural — A slight seasonal pick-up from construction is helping the plate and structural market. In **Chicago,** a mild order increase is in its second week and still growing. The trend has been noticed chiefly at the warehouse level, but some mills report they are getting more inquiries. One mill will have a section down for repairs for 2 to 4 weeks in the second quarter.

Plate customers in **Chicago** indicate they are still cutting inventory. Foreign plate is being offered at $15 a ton under domestic with buyers indicating they could get it down even more if they tried.

Wire—The seasonal pick-up in merchant wire for farms and welded wire fabric for road and building construction has been delayed by unseasonal weather in the northern part of the country. Production is about 80 pct of capacity in the **Midwest** and a slight increase is in prospect for May. In **Cleveland,** welded wire fabric is picking up seasonally but manufacturers wire is rather slow. Imported wire is selling there at $20 a ton under U. S. prices. In **Pittsburgh,** wire mills have no backlog.

Pipe and Tubing — Linepipe is still about the only product to show much of a pick-up. In **Pittsburgh,** new orders for other tubular products are running under 70 pct of capacity and mills are out of backlog. One pipe producer is operating both seamless and continuous weld mills at 15 turns, some of the pipe going into mill stocks.

Iron Ore — A big increase in taconite pellets is in the works for Reserve Mining Co. at Silver Bay, Minn. About 3.5 million additional tons of pellets annually will be made at the first big U. S. taconite plant.

PURCHASING AGENT'S CHECKLIST

Metalworking prices falter as competition toughens—an IRON AGE Special Report. P. 105

New buying and inventory techniques keep user stocks of malleable castings low. P. 109

Construction industry was largest steel user in 1959. P. 112

COMPARISON OF PRICES

(Effective April 19, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Apr. 19 1960	Apr. 12 1960	Mar. 22 1960	Apr. 21 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanied sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled trip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Apr. 19 1960	Apr. 12 1960	Mar. 22 1960	Apr. 21 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$34.50	$38.50
No. 1 steel, Phila. area	34.50	34.50	35.00	33.50
No. 1 steel, Chicago	31.50	31.50	30.50	33.50
No. 1 bundles, Detroit	30.50	30.50	30.50	31.50
Low phos., Youngstown	36.50	36.50	37.50	38.00
No. 1 mach'y cast, Pittsburgh	50.50*	51.50	52.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	52.50	52.50	52.50	51.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$33.50	$33.50	$33.33	$34.83
No. 2 bundles	22.83*	23.00	22.67	23.17
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	99.00*	99.375	100.25	102.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.30
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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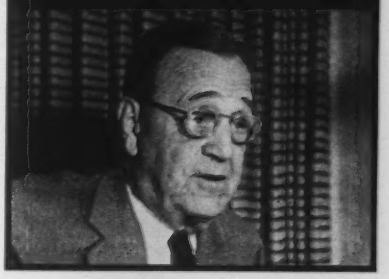

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Market Weakness Keeps Spreading

Buying is still at a minimum with little prospect for any improvement soon.

Export sales are the only area still showing any amount of strength.

■ The market continues to belong to the buyers—when they can be found.

Nowhere are there any signs of improved buying. Mill purchasing is at a minimum with few prospects for improvement in May. In some cases, brokers say they are able to buy at $2 under mill prices.

Dealers are selling new scrap intake but often only to meet operating expenses. Some are shipping fairly long distances to port areas for export. Others are showing resistance to lower price offers.

Weakness Spreads—The market weakness seems to be spreading out. Cast grades are less active with prices lower. Stainless grades declined this week in two market areas. There are even some dealer opinions export prices may drop soon.

February Statistics — Latest reports from the Institute of Scrap Iron & Steel show February scrap consumption was well ahead of most months in 1959. During the month 6.4 million tons of home and purchased scrap was used. But use of purchased scrap was off slightly from January levels.

Scrap exports are averaging 500,000 gross tons a month, the Institute says. Japan leads in purchases, taking 224,000 net tons in February.

Pittsburgh — Prices of most grades are unchanged with mill buying activity limited. One local mill bought No. 2 heavy melting at $29 and No. 2 bundles at $27. However, the total sale was less than 5000 tons and the purchase had little effect on the market. Shipments are moving freely on older orders for No. 1 heavy melting at $35 and $36. In some cases brokers say they have been able to buy $2 under the mill price. The flow of scrap into dealer yards has improved with the warmer weather.

Chicago—The market held on light trading with little new action by local mills. Broker buying prices continue fairly strong. Mill cutbacks are being offset by dealer resistance to lower price offers. Out-of-the-district scrap movement continues. Factory bundles are moving at both $36 and $37. Broker efforts to cover old orders moved railroad scrap at over the most recent mill delivered price.

Philadelphia—Most mills remain on the sidelines with export sales still putting a floor under the market. Four or five boats will probably be loaded between now and the middle of May. Current price levels are holding in a market where mill buying is practically non-existent. Yard collections have picked up with the change to warmer weather. But they are still well below former levels.

New York — Export sales are strong. But there are still no signs of improved domestic demand. Prices are unchanged.

Detroit—The market here is listless and virtually inactive. There has been no evidence of price changes for several weeks. Some dealers even predict the market may soften further during May. Industrial lists for next month are also expected to be lower.

Cleveland—Mills are showing a little more interest because of the attractive prices offered. But they are still doing practically no buying. Another small inside order from restricted yards for No. 1 heavy melting went for $35 or $1 below the previous order.

St. Louis—Some prices dipped in the face of continued lack of mill interest. One mill will only consider buying if it can purchase at lower prices. Another is buying, but in limited quantities. The market is quiet and scrap is hard to sell. No. 2 bundles last week should have been $21.50 to $22.50.

Cincinnati—Warmer weather has brought out more scrap. Dealers are selling their intake, but are reluctant to sell more. Older orders are being easily covered. Mill orders for May may be less, indicating a slower market.

Birmingham—The market is soft with scrap buying at low levels. Openhearth and electric furnace consumers expect to stay out of the market the rest of this month. However, export sales are showing a little life.

Buffalo — With steel operating rates in the area declining, scrap men can't find much cause for cheer. Generally the market is inactive with prices unchanged.

Boston—There's some buying for export, but domestic sales are absent. But export activity is only a little better than local sales.

West Coast—Export accounts for about the only trading in the market. The three major mill buyers are practically out of the market. Prices are soft all along the Coast. In Los Angeles, No. 1 cupola cast dropped $1 a ton.

Houston — The market is slow although there is some export activity. The low prices are discouraging scrap intake.

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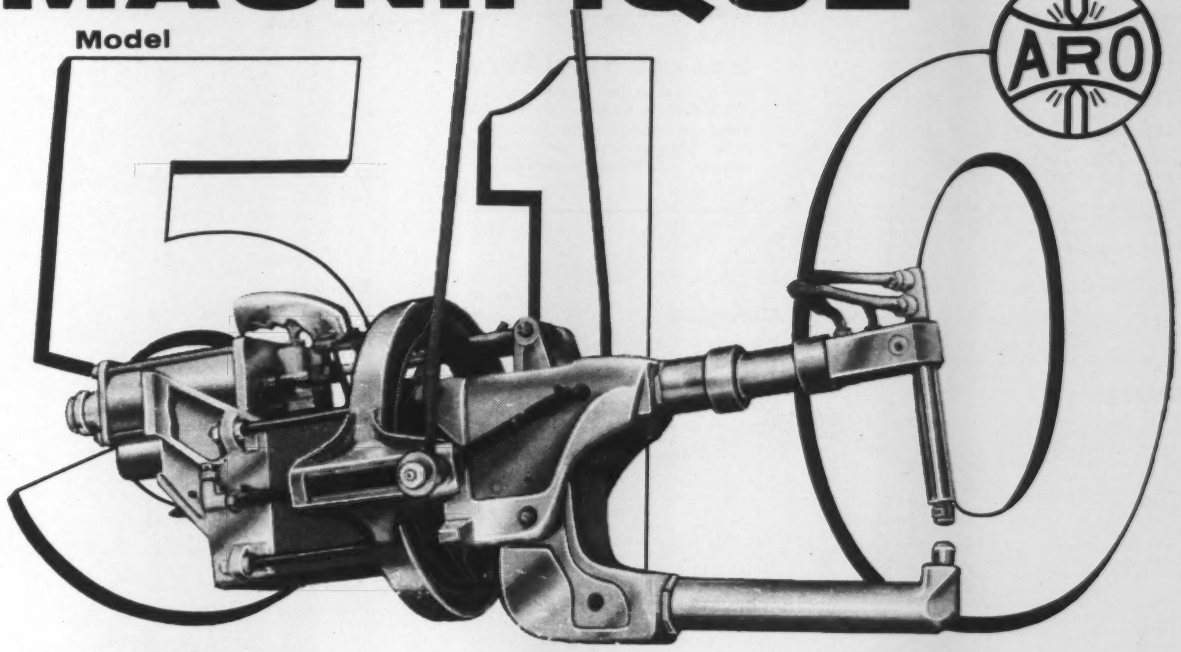
510



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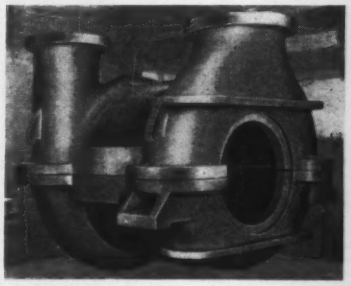

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TROY (GREEN ISLAND) N. Y.

SCRAP PRICES *(Effective April 19, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	34.00 to 35.00
Machine Shop turn.	17.00 to 18.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. punch'gs plate	42.00 to 43.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth	52.00 to 53.00
Rails 2 ft and under	58.00 to 59.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ¾ in. and heavier	38.00 to 39.00
Low phos. 2 ft and under	36.00 to 37.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth	45.00 to 46.00
Rerolling rails	53.00 to 54.00
Rails 2 ft and under	52.00 to 53.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	50.00 to 51.00
RR couplers and knuckles	41.00 to 42.00
No. 1 machinery cast.	52.00 to 53.00
Cupola cast.	46.00 to 47.00
Cast iron wheels	39.00 to 40.00
Malleable	50.00 to 51.00
Stove plate	42.00 to 43.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Clean cast. chem. borings	25.00 to 26.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	43.00 to 44.00
Rails, 18 in. and under	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	45.00 to 46.00
Malleable	55.00 to 56.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	40.00 to 41.00
Rails, random length	48.00 to 49.00
Rails, 18 in. and under	55.00 to 56.00
No. 1 cupola cast.	41.00 to 42.00
Hvy. breakable cast.	36.00 to 37.00
Drop broken cast.	50.00 to 51.00

Youngstown

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Low phos. plate	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	23.50 to 24.50
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	36.50 to 37.50
No. 2 bundles	19.00 to 20.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	40.00 to 41.00
Drop forge flashings	32.00 to 33.00
Low phos. punch'gs plate	33.00 to 34.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	48.00 to 49.00
Malleable	49.00 to 50.00
Stainless	
18-8 bundles	210.00 to 215.00
18-8 turnings	90.00 to 95.00
430 bundles	100.00 to 110.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	43.00 to 44.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	31.00 to 32.00
Foundry steel, 2 ft	33.50 to 34.50
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	21.50 to 22.50
Machine shop turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	19.00 to 20.00
No. 1 RR hvy. melting	36.00 to 37.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	46.00 to 47.00
RR specialties	42.00 to 43.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	35.00 to 36.00
Stove plate	40.00 to 41.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	37.00 to 38.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft	40.00 to 41.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth	45.00 to 46.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	42.00 to 43.00
No. 1 cupola cast.	48.00 to 49.00
Stove plate	48.00 to 49.00
Cast iron car wheels	40.00 to 41.00
Unstripped motor blocks	38.00 to 39.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	22.00 to 23.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	80.00 to 85.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	28.00 to 29.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	37.00 to 38.00
Mixed cupola cast.	43.00 to 44.00
Automotive cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	65.00 to 70.00
430 bundles and solids	80.00 to 85.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings	13.00 to 14.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	44.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron boring	$15.00 to 16.00
Elec. furn. 1 ft. and under (foundry)	41.00
No. 1 cupola cast.	37.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

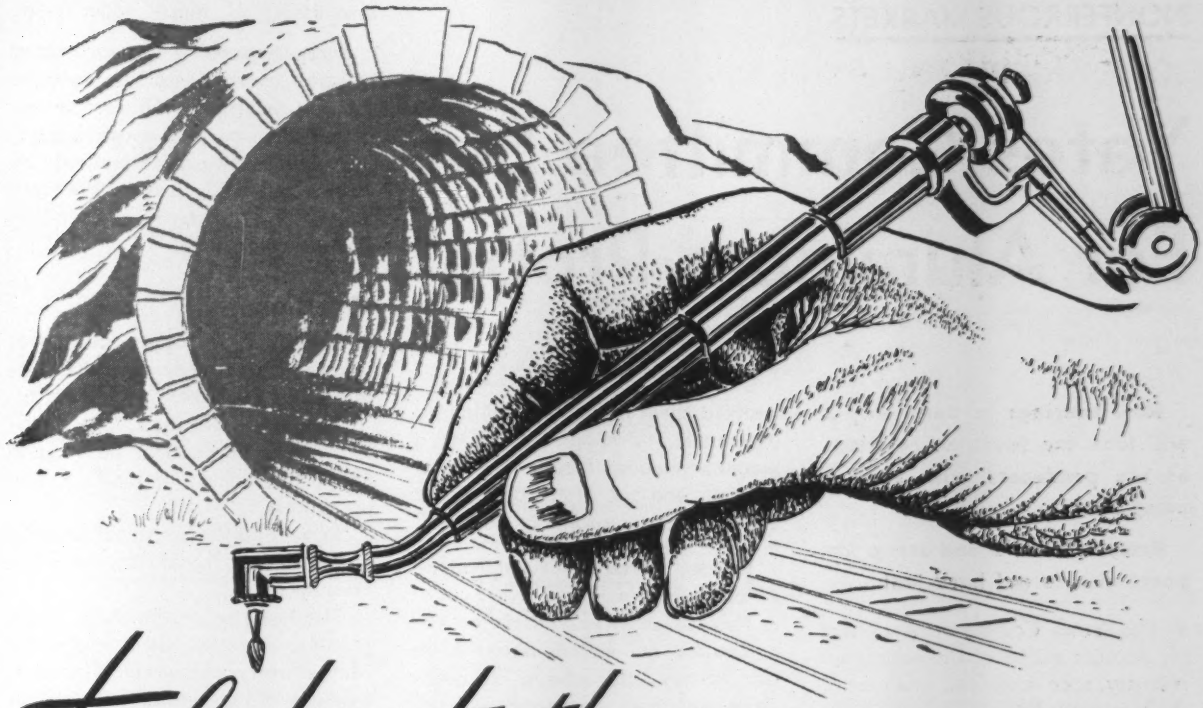
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Bush., new fact., prep'd	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	15.00
Shoveling turnings	17.00
Cut structural plate 2 ft & under	$40.00 to 41.00
Unstripped motor blocks	30.00 to 31.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	27.00 to 28.00



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Buried in antiquity is the origin of the first hand drill, but the first American percussion rock drill was patented in 1849 by J. J. Couch, of Philadelphia. In the same year, J. W. Fowle, who had assisted Couch, patented a drill of his own invention. When improved by Charles Burleigh, this drill was first used on the Hoosac Tunnel in Massachusetts.

Tools for teeth or tunnels, for mines, mills or military—today's demands require steel in unfailing quantity, of predictable quality and performance. To satisfy these demands, the supply of scrap must be continuously maintained.

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Yates Committee Set For Aluminum Probe

New hearings to open May 2 will look for facts on relations of big producers with smaller companies.

Price structure and scrap imports also to get hard look.

■ The Yates Committee is primed for another probe of the aluminum industry, specifically the relations of the major producers with the smaller companies.

Hearings will open on May 2, in Washington.

Rep. Yates told The IRON AGE that he is reopening hearings to "bring out the facts." He emphasized that no conclusions have been reached yet as to whether there are any problems that need government attention.

Hotter Hearings—Advance indication is that these sessions will be hotter, and probably more fruitful than the first set. Initial industry comment sees the election year as part of the reason for the new hearings. And many believe this will influence the possibility of action.

Rep. Sidney R. Yates (D., Ill.) is chairman of Subcommittee No. 3 of the House Committee on Small Business. He and the other four members first convened in November 1957, and again in March, April and May 1958 to consider "the situation of small business in the aluminum industry."

No Results — The sum total of their efforts was 467 pages of testimony and statistics. But no results. In fact, one independent extruder commenting on the new hearings said, "If I testify I will be sorely tempted, even though it wouldn't be diplomatic, to recite Rep. Yates's recommendations from the first hearings and ask what's been done. The answer is absolutely nothing."

Better Informed — What will be different this time?

First of all, Rep. Yates and the committee are better informed on the history, procedures, relationships and market structures of the aluminum industry. Many industry groups, such as the extruders and smelters, have been keeping the committee up to date on their views. And now that Rep. Yates has set the date for hearings he is likely to get a last burst of data.

Also, Rep. Yates is going to have executive sessions with both the Justice Dept. and the Federal Trade Commission, on April 27, before the hearings start. This exchange of views is likely to keep the hearings to facts and specifics, and avoid tangents. It could also lead to a united government stand.

Wider Agenda — The agenda is likely to be wider than last time. One of the key issues again will be hot metal—contracts by which large customers take delivery of molten aluminum for less than what is saved in pigging costs. However, this time there are two producers involved. Aluminum Co. of America, biggest producer in the world, is now included. This is bound to change the picture radically.

Prices—Another issue will be the price structure. Imports of primary metal, except from Canada, have all but dried up. But imports of semis and mill shapes are booming. Also, discounting is much wider now.

Scrap Imports — The movement of scrap overseas, up sharply since the last hearings, will receive renewed interest. And a new issue is the obvious government stand, by Justice and FTC, against producers merging with or buying smaller fabricating companies

Copper

The domestic copper industry is just about free of the record breaking strikes of 1959.

The latest from the Copper Institute shows production, both crude and from refineries, in the U. S. was up sharply in March.

So were deliveries to fabricators, so that stocks unsold at the refineries decreased.

The last two of the three major producers opened their books for May delivery last week. The sales manager of one said that, "based on just the first weeks" he was reasonably optimistic.

The sales head of the other says demand is good, and the company will likely book 20 to 25 pct more business than in the previous months this year.

Tin prices for the week: April 13—99.125; April 14—99.125; April 15 — 99.125; April 18—99.00; April 19—99.00*.
*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 213.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.9

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	50.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod 38.04

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 29.25
No. 120 ..... 28.25
No. 123 ..... 27.25
80-10-10 ingot
No. 305 ..... 33.75
No. 315 ..... 31.50
88-10-2 ingot
No. 210 ..... 42.00
No. 215 ..... 38.75
No. 245 ..... 34.00
Yellow ingot
No. 405 ..... 23.75
Manganese bronze
No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.75-26.00
0.60 copper max. 25.50-25.75
Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective April 18, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26½
No. 2 copper wire 24½
Light copper 22¼
*Refinery brass 22½
Copper bearing material 21½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 27
No. 2 copper wire 24½
Light copper 22¼
No. 1 composition 20½
No. 1 comp. turnings 20
Hvy. yellow brass solids 15
Brass pipe 14½
Radiators 16¼

Aluminum

Mixed old cast. ..... 15 —16
Mixed new clips ..... 16¾—17¾
Mixed turnings, dry ..... 15½—16½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 23 —23½
No. 2 copper wire ..... 20 —20½
Light copper ..... 18 —18½
Auto radiators (unsweated). 12½—13
No. 1 composition ..... 16½—17
No. 1 composition turnings.. 15½—16
Cocks and faucets ..... 13 —13½
Clean heavy yellow brass ... 11¾—12¼
Brass pipe ..... 13½—14
New soft brass clippings .... 14 —14½
No. 1 brass rod turnings .... 11½—12

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 7 — 7¼
Old zinc ..... 4½— 5
Zinc routings ..... 3¼— 3½
Old die cast scrap ..... 2¾— 3

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 28-29
Clean Monel turnings 20-23
Old sheet Monel 24-26
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8 — 8¼
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 55 —56
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 13¼—13¾
Siphon tops 41
Small foundry type ..... 9¾—10¼
Monotype ..... 9¾—10¼
Lino. and stereotype ..... 8¾— 9
Electrotype ..... 7½— 7¾
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective April 18, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*		7.225 *E2*				6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*										
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective April 18, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5, B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10 N6*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective April 18, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

STANDARD T. & C.	BUTTWELD ½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½ In. Blk.	2½ In. Gal.	3 In. Blk.	3 In. Gal.	3½-4 In. Blk.	3½-4 In. Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*?.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective April 18, 1960)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium.. .955 D-3, D-5
Oil hardened manganese .505 O-2
Special carbon ..... .38 W-1
Extra carbon ..... .38 W-1
Regular carbon ..... .325 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	15.35
Cleveland *R3*	.....	.....	.....	10.10	.....	.....
So. Chicago *R3*	.....	.....	.....	.....	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective April 18, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	193	...	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*****	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***.	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2***.	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**.	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin, Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*.	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots, except as noted)

Iron Powders

Sponge Iron, domestic and foreign, 98 pct Fe, 100 mesh bags	11.50
Electrolytic Iron, melting stock, 99.87 pct Fe	28.75
Carbonyl Iron	88.00
Welding Grades	8.10
Cutting and Scarfing Grades	9.85

Copper Powders

Molding Grades	
Electrolytic, domestic, f.o.b. shipping point	14.25†
Atomized	47.50 to 65.50
Reduced	14.25†
Bronze, 5000-lb lots	54.00 to 57.60
Chromium, electrolytic	5.00
Lead	7.50†
Manganese, electrolytic	$1.00
Molybdenum	$3.60 to $3.95
Nickel	$1.15
Nickel-Silver, 5000 lb lots	60.90 to 69.70
Solder	7.00†
Stainless Steel, 316	$1.07
Tin	14.00†
Titanium, 99.25 + pct, per lb, f.o.b.	$11.25
Tungsten	$3.15 (nominal)

† Plus cost of metal.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

Plain finish—packaged and bulk	50 pct
Hot galvanized and zinc plated —packaged	43.75 pct
Hot galvanized and zinc plated —bulk	50 pct

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

Plain finish — packaged and bulk	50 pct
Hot galvanized and zinc plated—packaged	43.75 pct
Hot galvanized and zinc plated—bulk	50 pct

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish — packaged and bulk	50 pct
Hot galvanized and zinc plated—packaged	43.75 pct
Hot galvanized and zinc plated—bulk	50 pct

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30
Tin, ball anodes $1.05 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24				
Baltimore**	$.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		7.43	9.50	9.89	8.91	7.79	8.00	9.09	13.14	16.76			
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	7.59	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.193	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.95[1]	11.55	12.20	11.55	10.00	10.00	9.75	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11				
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	.10	9.20	10.10	10.99	11.20	9.65	9.95	9.60	12.05	16.58	16.48	20.08	20.03
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	17.35	22.90	22.20
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.69	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64		16.69		21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅞" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective April 18, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66-00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	31.75 48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

(Effective April 18, 1960)

There's No "GUESS WORK" with a TINIUS OLSEN AIR-O-BRINELL Metal Hardness Tester

Preset the exact load you want by means of accurately regulated and maintained air pressure—no dead weights or hydraulics. Reproducible load application is assured. Use anywhere standard air pressure is available—in lab or shop.

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TINIUS OLSEN
Testing Machine Co.
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PUZZLED . .

about personnel problems

Dissatisfied with present recruiting methods? The IRON AGE Employment Exchange is the meeting place for employers, and men qualified in all phases of metalworking. For advertising rates, write to Chestnut and 56th Sts., Philadelphia 39.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective April 18, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed) $1.48
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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TYPICAL PACKAGE DRIVES

(1) 3000-HP. Gen. Elec. Motor, 600-V.D.C. 90/180 R.P.M. with
(1) 3000-K.W. 3-unit Allis-Chalmers M.G. set, 600-V.D.C. with 5000-HP. Syn. Motor 13800/-6900/4160-B., 3 ph., 60 cy. & Mag. F.V. starting equipment.

(2) 600-H.P. Al-Chal. Motor, 600-V.D.C. 300/600 R.P.M. with
(1) 1000-KW. 3-unit M.G. set (2) 500-K.W. 600-V.D.C. Generators, & 1500-HP. Syn. Motor, 2300-V., 3 ph., 60 cy. & starting equip's.

(2) 300-HP. Whse. Motors, 230-V.D.C. 300/600 R.P.M. with
(1) 600-KW., Gen. Elec. 3-unit M.G. Set (2) 300-KW Generators & 750-H.P. Syn. Motor. 4160/2300-V., 3 ph., 60 cy. & Mag. F.V. starting equipment.

(Any above items can be purchased separately)

ADJUSTABLE SPEED MOTORS

QU.	H.P.	MAKE	VOLTS	R.P.M.
1	2700	G.E.	415	280
1*	2550	Whse	700	108/162
1*	2200	Whse.	600	92/132
1*	2000	G.E.	600	200/400
1*	2000	G.E.	350	230/350
1*	1750	G.E.	600	200/300
1*	750	Whse.	250	200/400
4*	700	Whse.	250	300/700
2*	645	S & S	300	1000
1	600	Whse.	250	110/220
2	235	Whse.	230	325/975
1	150	Whse.	230	400/1200
3	125	Whse.	230	350/1050
1	125	Whse.	230	450/900
1	35/110	G.E.	250	255/1650
1	75	Whse.	230	250/1000

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3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	800	Whse.	CW	550	1776
1	800	G.E.	MT-428	2200	450
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-32D-15	440	1778
1	550	Whse.	CW	440	252
1	500	Whse.	CW	550	350
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	250	A.C.	ANY	550	600
1	250	Cr.Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
2	200	G.E.	IM-17A	2200	435
1	200	G.E.	1M	2200	580
1	125	G.E.	MT-557	220/440	1200
3	100	A.C.		440	695

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
2	500	Whse.	CSP-583H	440	3600
1	500	Whse.	CS-1115	2200	863/445
4	500	Whse.	CS-1216	2200	500
2	450	Ell.	F-3910	2200	1200
1	400	Whse.	CS-7151-610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-875S	2200	1775
1	200	Whse.	CSP-581S	440	3450
2	200	Whse.	CS-855S D.P.	220/440	1750
1	200	Whse.	CS-873C	2200	1160
1	150	G.E.	FT-558	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-764C	220/440	1160
3	100	Whse.	CS-760C	2200/440	1100
1	100	Whse.	B.B.CS-607	220/440	1780

SYNCHRONOUS

1	6000	G.E.	ATI .8	2200/6600	600
1	3500	G.E.	TS 1.0	4600/2300/4000	360
1	2000	G.E.	ATI	2300	900
2	1750	G.E.	ATI	2300	3600
1	1750	G.E.	TS	2300/4600	900
1	700	G.E.	TS .8P.F.	2300	1200
1	400	G.E.	TS-7563S	2200	1200
2	350	G.E.	ATI 1.0P.F.	2300	150
1	325	G.E.	ATI 1.0P.F.	140	1800
2	300	Ell Mach.	BRKT	2200	1200

BELYEA COMPANY, Inc.

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Tel. OL 3-3334

Pittsburgh Market Remains Slow

Used machine dealers in the Pittsburgh area say business is still slow.

The boom expected after the end of the steel strike never materialized.

■ For most Pittsburgh dealers, business is drifting along about the same. In the few cases where an improvement had been reported a month ago, sales have dropped back to earlier levels.

One sign of the times: More fabricating equipment seems to be coming on the market. One dealer says two or three auction lists are hitting his desk each day. These are not taken to mean a general collapse of industry, but they do seem to indicate a trimming down by plants.

New Story—With better equipment available, dealers say the price picture has improved. Last year customers were being offered older machines and were pushing hard for the lowest price. Today, there is more interest on the basis of machine quality.

Electrical equipment seems to have run through a complete buying cycle in a period of a few months. Right after the steel strike, there was a buying lull. In this period the mills were operating at high levels and expected to stay that way.

Steel Billboard—About a month ago, clear signs of future weakness began to appear in the steel picture. The mills were still operating well but were approaching a slide. It was at this time that purchases of used electrical equipment began spurting. Heavy ordering continued for three or four weeks.

In the current month, steel operations are down sharply and equipment orders have fallen with them. Discussing these swings, one supplier feels the place of used equipment in the buying scheme may have been pinpointed more clearly.

"They didn't turn to used equipment until business started to slide," he says. "Once the slide started, they stopped buying altogether."

What may have hurt dealers is the fact that the period between full prosperity and extreme depression was very brief this year. A supplier of machine tools says the first two weeks of March saw a decided improvement, but now business has fallen off again.

In the machine tool line, there has been no great opening up of supply. Good late models are still scarce and the demand for older machines is skimpy.

Materials handling equipment never did get off the ground this year. Dealers say there have been minor ups and downs, but no sustained gains. There does not seem to be any general interest in major construction and modernization. Interest still centers on conveyors and light cranes; demand for heavy cranes is weak.

"There is no sustained spending," says a dealer. "You have spot moves here and there, but no real programs."

A supplier of steel mill equipment says inquiries are lagging, but that there are still buyers.

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500-ton H.P.M., platen 38" x 36", stroke 24", daylight 42". Price inquire.
500-ton Elmes, platen 35" x 66", stroke 18", daylight 32". Price $18,750.
400-ton W.S. platen 41" x 36", stroke 36", daylight 108". Price $11,750.
200-ton Southwark, 88 ton cushion platen 33" x 28", stroke 24", daylight 50". Price $11,750.
150-ton Southwark, platen 28" x 45", stroke 30", daylight 38". Price $7,500.
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1—5 Ton SHAW O.E.T. CRANE, cab operated, Serial 1436, Lift 11-2", span 31"-8½", 3 motors, 230 volt D.C.

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234 CFM	100 psi	9 x 9 Ing.—Worth. Chic Penn
268 CFM	500 psi	10-4½ x 10 Ing.
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364 CFM	100 psi	10 x 9 Jay WG9
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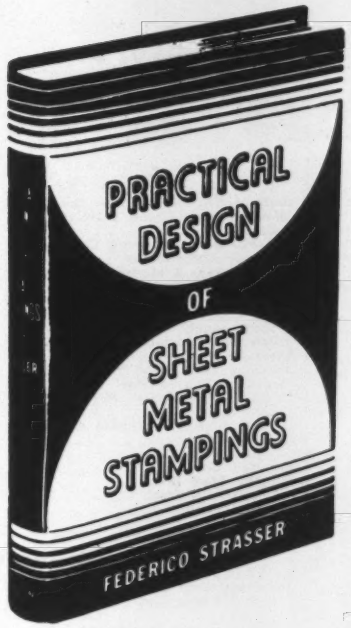

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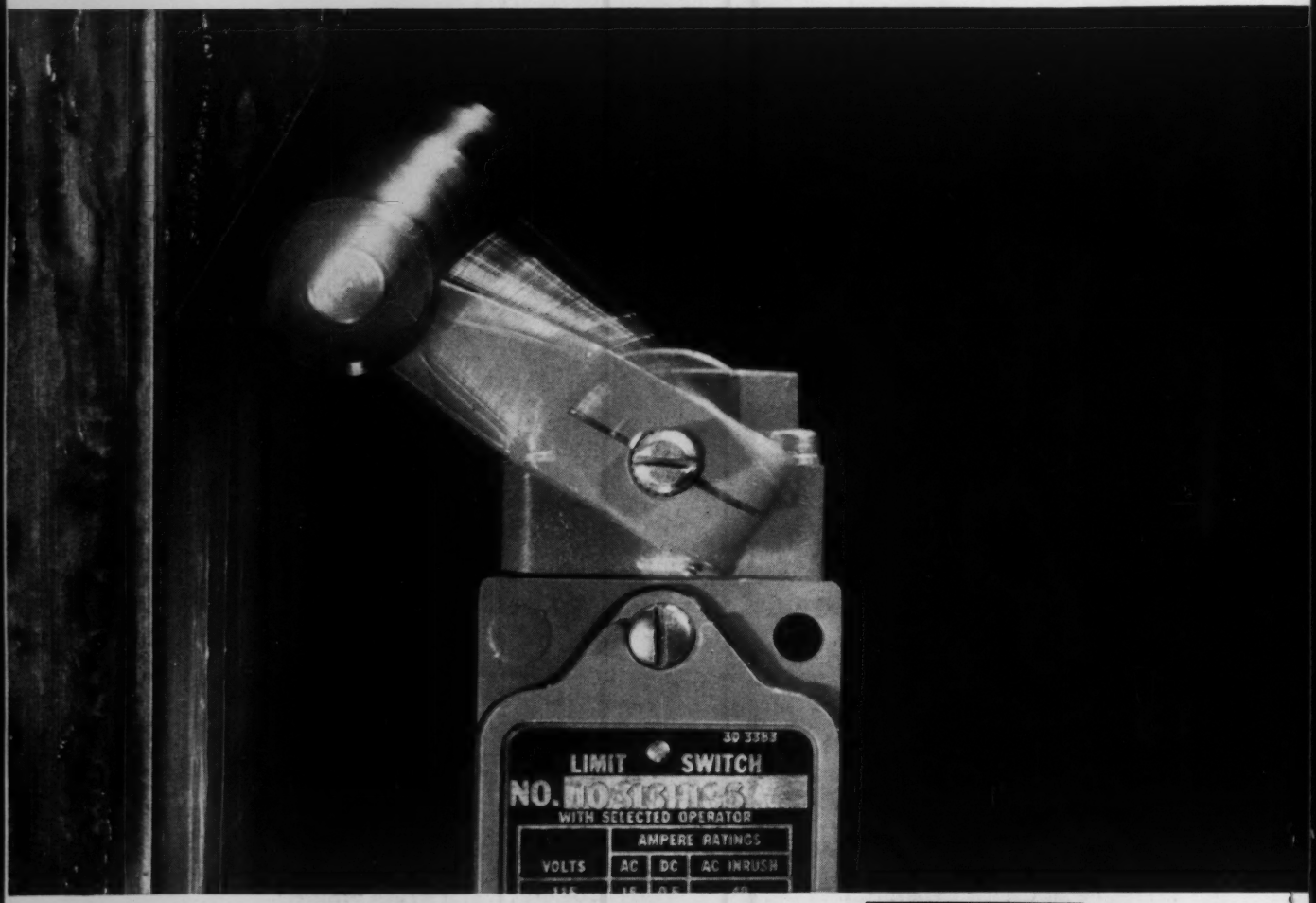

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